Open Source Architecture

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Author's Note

The ongoing project that has become this book began with a solicitation from Domus Magazine: an editorial, by Carlo Ratti, to be published in Domus #948 for Spring 2011, the special issue on ‘Open Source Design.’ When he was asked to write on the theme, Ratti responded with an unusual suggestion: in keeping with the open source directive, authorship could become plural. Within a few hours, a page was started on Wikipedia, and an invitation was sent to an initial network of collaborators.

The kernel of an idea, so-called ‘open source architecture,’ was in the hands of the group, and expanded at each stage. In its online form, the text provoked widely varying responses and became the subject and object of an evolving dialogue. The article that was finally printed in Domus is a capture of the text as of 11 May 2011, but the Wikipedia page remains online as an open canvas – a 21st century manifesto, transformed by permanent evolution.

The idea continued to grow, pointing towards full treatment as a book. Faithful to the original methodology, Open Source Architecture began with the impetus of open sourcing, in much the same way as the Domus article. An initial framework was the product of energetic discussion, and after words were put to page, the body of text was expanded, honed, and augmented by a group of adjunct editors from the worlds of art, architecture, literature, and theory (more information about this process and retrospective description of its denouement appears in Chapter 7).
The text that ultimately emerged from all of this has an uncommon rhetorical structure. Not unlike tacking in a ship – cutting back and forth to move upwind – the argument pushes forward vigorously and along different vectors. The voice carries far in one direction before swinging back in another, yet it always maintains a clear bearing and a forward thrust. That orienting vector – a common belief in the idea of open sourcing – is shared by the collective author, but an aggregate structure of chapters as self-contained arguments promotes internal Verfremdung and criticism, allowing for the productive superposition of ideas among the authors and adjunct editors. Beyond the internal alchemy, we hope that this structure will solicit a critical response from the reader as well. Open Source Architecture invites a constant reassessment of the rhetorical direction, as its voice moves from monochord to choral.
Chapter 1

The Promethean Architect: 
A Modern(ist) Hero

The first right on earth is the right of the ego.

* * *

Le Corbusier’s hand hovers, as relaxed and self-assured as Michelangelo’s God creating Adam; it is the hand of the artist, touching the spark of life into a new world.

Le Corbusier’s vision was unveiled on a crisp fall day in 1925, at the Exposition des Arts Décoratifs in Paris. Two enormous models, each 100 square meters, showed the Swiss architect’s 1922 Ville Contemporaine, a modern city for 3,000,000 inhabitants, and his subsequent Plan Voisin, a business district in the heart of Paris. The work was not part of a larger exhibition or even an installation
filling an entire room – it could only be presented in its own freestanding structure, which he titled Le Pavillon de l’Esprit Nouveau, the “Pavilion of the New Spirit.”

It was autonomous, free, unencumbered by cultural reference or even traditional means of display: as Le Corbusier himself stated, “modern life demands – is waiting for – a new kind of plan.” This was not ‘architecture,’ by any traditional definition, nor was it design or building or abstruse theory. Here, after his incendiary manifesto – Architecture or Revolution! – Le Corbusier’s word became flesh.

The concept of the Ville Contemporaine was simple: to erase Paris’s dense encrustations of built space, leaving only Notre Dame cathedral as a memory of the past. Advances in technology would be mobilized to usher in an age of systematic, efficient buildings and to improve the standard of living. This city of the future would be realized as multi-use cruciform towers, laid out in an orthogonal grid on the tabula rasa of a formerly cluttered, unproductive, and socially rotting city.

The Pavillon de l’Esprit Nouveau, as a whole, was a comprehensively designed manifestation of Le Corbusier’s architecture-as-social theory. “On the walls were methodically worked out plans for cruciform skyscrapers, housing colonies with staggered lay-outs, and a whole range of types new to architecture that were the fruit of a mind preoccupied with the problems of the future.” All of this – sweeping visions of entirely new modes of habitation – from the fecund hand of a single architect.

Le Corbusier’s authorial voice echoed from architecture to furniture to theory, across the very functioning of society itself. He dreamt of implementing mass production in new ways, creating pure forms for every dimension of a standardized – an idealized –
life. He understood that “the sphere of architecture embraces every
detail of household furnishing, the street as well as the house, and a
wider world still beyond both.” When it came to creating a
context for human life, Le Corbusier couldn’t be bounded, couldn’t
rest on the seventh day. He sought to create “another city for
another life,” as Constant Nieuwenhuis proposed decades later,
and spread that idea enthusiastically, whether by building or
writing. The brilliance of his Ville Contemporaine was how each
element fit precisely together in a seamless, coherent, and efficient
whole: one that could be expanded and replicated ad infinitum.
The Swiss had created clockwork – an elegant social machine with
cogs and springs of architecture. As Tom Wolfe wrote, “Le
Corbusier. Mr. Purism… built a Radiant City inside his skull.”

* * *

What Le Corbusier executed with grace and élan – architectural
omnipotence, whether real or rhetorical – was the distilled goal of
high modernism. The movement dreamed of and fought for the
expansion of the architect; through the decades leading up to and
following the Second World War, he was empowered to
disproportionately influence every aspect of the human condition.
Fueled by the political economy of the 20th century, the rise of the
welfare state was an engine for top-down development. Propelled
by this momentum, the architect became concerned with more
than simply constructing iconic buildings; rather, his purview
stretched to encompass the whole of human life, even its banalities
and underlying functions. He reimagined society itself.
During the early 20th century, at the time Le Corbusier was working, there was a general sentiment that European culture had been destroyed by wars or had become so cluttered with nostalgic detritus as to be uninhabitable. It was on this soil that the Promethean architect alighted. He delivered the triumph of top-down, comprehensive design: *everything worked*. Not only did it work, but it ticked effortlessly with the smooth grace of pure rationality – this was the authority that Le Corbusier fully assumed the day he unveiled his Pavilion, his hovering hand announcing a pure, single-minded vision... and society could not help but follow in queue.

Yet Le Corbusier’s ascension to the modernist throne was borne upon an epoch’s momentum. The idea of social orchestration through a comprehensively designed environment stretches as far back as the 18th century French architect Claude Nicolas Ledoux, who, tellingly, titled his own monograph *Architecture Considered in Relation to Art, Morals, and Legislation*.⁸ With the mandate of the king, Ledoux flexed his authorial muscles, expanding the boundaries of the architectural profession.

His masterwork was the *Salines de Chaux*, a royal saltworks that became the archetype of utopian masterplanned cities during the industrial era. In both organization and decoration, the complex expressed a dominion of man’s rationality over the rude forces of nature: it was a crystallization of contemporary French philosophy, drawing on ideas about the natural structure of the universe and society. Architecture was at once physics and metaphysics. The plan of the saltworks, for example, is a semicircle, representing geometric purity and as well as providing optimal visual access to the overseer, whose house sits at the center. Ledoux understood the facility as two interdependent systems and two geometries – the administrative directorship, including the overseer and the tax
agents, which lay on the diameter of the hemisphere, and the worker’s housing, which was arrayed on the perimeter. Line and arc.

Each building, in fact, clearly expressed its function in its appearance – an architectural concept, attributed to Ledoux, known as Architecture Parlante (speaking architecture). The director’s house looks like authority, the worker’s houses look like worker’s houses. The home of the overseer at the river source appears to be an enormous water valve – an architectural gasket that the river literally rushes through. Oikema, the ‘house of pleasure,’ is the unbuilt (unfortunately for the amusement of future architecture students) phallus of the saltworks.

For Ledoux, architecture was simultaneously an industrial, social and aesthetic tool. It was a full-fledged attack on what he called ‘haphazard construction,’ using the artillery of rationality. The project functionally produced salt, and conceptually organized man in the fractal-like mechanistic clockwork of the universe. This was Descartes’ French industrial society, after all.

Yet the act of creating entire cities – and particularly the archetype of a designed social utopia – extended beyond the philosophical and political climate of 18th century France. Decades later, Charles Fourier conceptualized the phalanstère, (1822) a reproducible building type that generated a microcosmic social order within a single structure. It would be a self-contained community of approximately 1500 people working together for the common good. The project was as much about social theory as architecture, the nuances of which Fourier published in his journal Le Phalanstère, after which the structure was simply a physical manifestation of social organization. There was an emerging idea that architecture
could influence every aspect of man’s condition, from individual
daily functions to the collective mechanism of society.

Across the channel, contemporary English social theorist Jeremy
Bentham wrote enthusiastically, “Morals reformed, health
preserved, industry invigorated, instruction diffused, public
burdens lightened, economy seated, as it were, upon a rock,
the gordon knot of the poor-law not cut, but untied – all by a
simple idea in Architecture!” A bold vision that Bentham sought
to realize by creating a new functional order within the walls of a
prison: the *Panopticon*. The full title of *The Panopticon* writes
announces that the novel typology contains the “idea of a new
principle of construction, applicable to any sort of establishment,
in which persons of any description are to be kept under
inspection... with a plan of management adapted to the
principle.” Just as the *Salines de Chaux* married geometry and
social structure, Bentham’s ‘new principle of construction’ was to
array prison cells (or hospital rooms or students’ desks) around the
perimeter of a perfect circle and position an Inspection House at its
center, both in plan and section. The overseer would be able to
watch inmates at all times without their knowledge (and as a result,
would not necessarily need to watch them at all times), and
prisoners would work menial jobs, to the point that the prison
could even turn a profit. Just as Fourier’s idealized *phalanstère*, the
Panopticon was a self-contained ecosphere – a totalitarian one,
perhaps – but a socially-derived architecture nonetheless.

The mentality of a city as *designed social framework* was inherited
by subsequent radical movements of the early 1900s, working not
only in social, political and economic dimensions, but also in the
infinitesimal details of culture and aesthetics. This was the
apotheosis of *gesamtkunstwerk* – a German term, popularized
almost a century earlier by composer Richard Wagner to
describe a comprehensive, total work of art. The lone visionary modernist now found himself designing not only an office building, for example, but also the employees’ desks, their modes of transportation, their homes, tables, chairs and even the soup spoons they used for dinner. As the Dutch saying goes, *Van stoel tot stad*, or *from stool to city*. The emerging mentality was that anything and everything could be designed... certainly a compelling mandate for the architect.

“The ultimate goal of all art is building! Let us strive for, conceive and create the new building of the future that will unite every discipline, architecture and sculpture and painting, and which will one day rise heavenwards from the million hands of craftsmen as a clear symbol of a new belief to come,” (Gropius). With this passionate manifesto, the messianic voice of Walter Gropius turned *gesamtkunstwerk* into a religion. This was the Bauhaus.

A new conception of design was distilled as the Bauhaus, *the house of construction*, an experiment in pedagogy and a proving ground for what architecture could be. Within the walls of what Tom Wolfe later described as an “exclusive compound,” speculations of the future were created. Clear visions of its character sprang from the minds of students and faculty alike (ideas with as much variation as the strictures of the school’s totalizing aesthetic could encompass: white, rational, clean). Students participated in all subject matters and collaborated vibrantly, working towards a cohesive, designed environment. The Bauhaus sought to forge a new meaning for the architect of the future. All arts would come together as a single, elegant *gesamtkunstwerk*, articulated through a top-down model of design. Students at the Bauhaus created capital-a Architecture, and it sparked a generation of visionaries compelled by the elegance and the new possibilities of a comprehensive environment.
While the academic, research-based environment of German modernism was more collaborative than its French counterpart, out of the Bauhaus and in its wake, titans of design thundered across the architectural landscape of the 20th century – they who singularly committed great acts of pure creation. These men helped to crystalize the great Promethean myth of the architect, one that persists from Romantic times through Ayn Rand’s *The Fountainhead* and up to today.

At once iconic and timeless, *The Fountainhead* is a novel surrounding the life of a heroic architect, Howard Roark who makes the ultimate artistic sacrifice – death, rather than betray his aesthetic vision. It presents an image of the lone creator (a persona distilled from the mythologies of those 20th century architects and inspired Frank Lloyd Wright): brilliant, aloof, and with unshakeable self-confidence and the inexhaustible optimism of a being – something more than a man – empowered to save society.

That is the tension exacerbated by the Bauhaus’ hermetic enclosure or Le Corbusier’s cold genius; how can the architect be part of the world around him yet simultaneously achieve unfettered innovation? The artist must unmoor himself if he is to substantiate what Le Corbusier called “a new spirit… a state of mind which has its own special character.” Howard Roark, the uncompromising protagonist, is crafted as a manifestation of this unadulterated creative force and is ultimately unraveled by its pivotal tension. The will to pure art is existentially incompatible with society.

“Well, the unsubmissive and first, stands in the opening chapter of every legend mankind has recorded about its beginning. Prometheus was chained to a rock and torn by vultures — because he had stolen the fire of the gods… Whatever the legend, somewhere deep in the shadows of its memory mankind knew that
its glory began with one and that one paid for his courage.”21 Ayn Rand’s cynosure of courage is condemned to suffer. This is understood to be the burden of the architect: enlighten humanity with the fire of the gods. Rejection is only a confirmation of genius.

Far from a fictional account, the polarizing debate and shifting balance of power between client and architect recurs throughout the 20th century. The tide that had been gathering for decades (driven, in no small part, by the sprezzatura of Le Corbusier’s nonchalant hand) finally reached its height. It took The Fountainhead’s bestseller appeal to spell it out, but suddenly it was obvious. The novel famously championed the creative genius, celebrating the architect’s vigorous inspiration and autonomy in the face of philistine clients. The Fountainhead promoted the idea that architects should (even have a responsibility to) educate the bourgeois. Rand’s none-too-fictional protagonist firmly cemented the stubborn resolve of architects across the globe: If Howard Roark could put his foot down and refuse the bad taste of boorish clients, so can I, architects thought. Gradually, inch-by-inch, the enlightened designer had been gathering the authority to reform humanity through his craft, and Ayn Rand, the novelist, simply put it to words.

With a radical manifesto and architecture presented as rhetoric, photograph, and dynamic film, Le Corbusier set in motion a shift towards the mediatization of the architect. He wrote as prolifically as he built, using both to effect a new social program. This was not necessarily new – writing and architecture have gone hand in hand since 15 BC, when Vitruvius wrote De Architectura (Ten Books on Architecture), through classical treatises, and continued into the 20th century. As Gideon Fink Shapiro described, “The European avant-gardes of the 1920s, eager to revolutionize making and thinking for the modern world, yet lacking the means to test their
ideas in practice, presented their work in numerous small but influential international journals.”

Indeed, as Keller Easterling notes, “Modernism is a vampire. Modernism never kills modernism. It only keeps it alive. Modern is successive. Modern is finally possible often because of a new technological development or an ultimate solution. The zero-hour Promethean figure continues to challenge us to a duel. We end up writing manifestoes in their image.”

Over the course of the 20th century, what began as modernists’ manifestos became Venturi’s architecture for the average Joe, Deconstructivists’ arcane linguistics, Koolhaas’ brick-like mega-monomographs, and today’s online blogs. In 2009, Bjarke Ingels even released an ‘archi-comic’ titled *Yes Is More* – an uncannily appealing architectural graphic novel in which Ingels himself appears to explain his ideas and his work. To maintain a prolific output of written and analytical work, Ingels’ alma mater, OMA (the office of journalist-turned-architect Rem Koolhaas), established a mirror operation called AMO, dedicated entirely to print products. As a self-reflexive exclamation point, or ;-) the firm presented *The OMA Book Machine* at London’s Architectural Association: 35 years worth of publications collated into a single, massive volume over 40,000 pages long.

Indeed, architecture today measures up to the extents of society: the architect is author of every scale and scope, from the stool to the city. He has designed the future, he has designed the present, and has even claimed the power of designing retrospectively. Critic and historian Deyan Sudjic described the colossal gravity of modern architecture as both a physical and cultural phenomenon: it is a means of expressing absolute power. “In its scale and its complications, architecture is by far the biggest and most
overwhelming of all cultural forms. It literally determines the way
that we see the world, and how we interact with each other. For the
patron, it is a chance to exert a sense of control over events. And
for a certain kind of architect it offers the possibility of control over
people.”

Architecture has swelled beyond all limits. The profession has
reached a fever pitch, culminating in today’s global architect. “This
new professional wanted to be free from everyday environment
and its traditions, constraints, and limitations. From now on, focus
was on innovations and a new way of building,” (Habraken). After Ledoux, after Le Corbusier, after Howard Roark, after the
ascension of the architect to near-mythic status, there is no reason
for a creator to be fettered. Why should he be?

The phenomenon of ‘starchitecture’ rides the crest of this wave. An
elite cadre of the mega-famous has emerged to design the latest
high profile buildings, from international airports to contemporary
art museums. In her Towards a Global Architect, Beatriz Colomina
writes, “It is not just that space has collapsed with the introduction
of rapid air travel; time has expanded. Le Corbusier had already
foreseen the implications of this new condition for the architect.
Practice is no longer local and time is continuous – almost a
banality today when architectural offices with outposts in several
cities around the world, connected through the Internet and by
video conferencing, work 24 hours a day.” The architect has
swelled beyond spatio-temporal human constraints.

This new, ubiquitous designer is a fulfillment of what the young
provincial artist named Charles-Édouard Jeanneret-Gris invented
and called Le Corbusier. The dreams of an entire era – global
networks, architecture-as-media, speed, standardization, and
efficiency – have at last come true.
... but what has architecture given us? Where is the pure clockwork of social utopias that Ledoux, Bentham, Fourier, Le Corbusier, and Gropius promised?

Architects have become isolated. In an accelerating bid to design society as well as every one of its cultural products – and finally to enlighten the public as to what it all means – the lone genius has distanced himself from that public itself.

The modus operandi has increasingly been to design buildings with as much visibility and cultural importance as possible, rather than addressing the questions at the root of human habitation, to say nothing of social utopias. The engine of architecture has been geared towards the privileged few: today, buildings designed by architects account for no more than 2% of global construction. Easterling observed that “the building as a singularly authored object is responsible for a relative trickle of the world’s spaces while a fire hose blasts out the rest.”27 Globetrotting starchitects have gathered what appears to be absolute control, unconditional omniscience, and supreme authority, yet their oeuvre amounts to almost nothing. They have willingly relegated themselves to a claustrophobically thin crust of global production. Power is used and abused – from masterplanned cities to corporations to single patrons – yet the common denominator is a grand, iconic building or masterplan that has little to do with the vast majority of its inhabitants. It could be argued that through books, film, the Internet, and finally sheer willpower, the cultural idea and self conception of the architect has enjoyed wild success, whilst
architecture itself has failed – both as a business model and as a tool for beneficial social change.28

“The unspoken issue,” notes Alex Haw, “is difficulty of metrics; how do you measure success if not by column inches? What social condition can be adequately geometricized?”29

Architectural historian Wouter Vanstiphout contends, sharply and uncompromisingly, that “to restore architecture and planning to a position where it can have a real positive impact on society may even demand destroying the mythology of the architect as visionary.”30 In the architect’s great ascendency to mythic status, he has painted himself as a ‘visionary’ yet in so doing he has disconnected himself from human life and extinguished the possibility of affecting it.

“Architecture has drifted into the stratosphere, where it’s not even as simple as designs being produced which have no relationship to actual buildings, but it’s even that the buildings that are being produced have no relationship to actual needs,”31 Vanstiphout continues, succinctly. It is the comic irrelevance of Skymall – the ubiquitous distributor of $29.95 numskullery – but on the very non-comic scale of billions of dollars.

Where is the upper limit? How far will architecture drift into the stratosphere before tumbling back down to reality? When will the (pure, white, rational) ideological edifice that Le Corbusier so solidly constructed finally crack?

1 Ayn Rand, ‘The Soul of an Individualist,’ For the New Intellectual: the Philosophy of Ayn Rand, p.82, 1961


4 ibid


15 ibid


20 Corbusier, Towards an Architecture
21 Rand, Ayn. The Fountainhead


29 Haw, Alex. Personal Communication as Adjunct Editor. January 2014.


31 ibid
Bottom-Up Architectures:
The Timeless Way of Building

Vous savez, c'est la vie qui a raison, l'architecte qui a tort. / You know, it is always life that is right and the architect who is wrong.
— Le Corbusier, quoted by Philippe Boudon, Lived-In Architecture: Pessac Revisited, 1969

* * *

The cities of Italy are diverse – from the unique canal culture of Venice to the dense, twisting streets of Rome to the hill towns of Tuscany – yet they share a common quality: intricate detail and infinite variety. Each city is an aggregation of layers, of stories, of voices, of family lines and struggles for power. It is an archaeology of experience, cemented in art, buildings, and piazzas. These cities are brought to life by the same streets that have been walked for
hundreds of years; Giorgio Vasari’s 16th century Florence was younger, but no less rich in variety. Legend has it that the young Vasari left his small hometown of Arezzo, Tuscany, in 1527 with an artistic recommendation from the local Cardinal. Upon arriving in the thriving city of Florence, he was surrounded by a constellation of art and architecture unlike anything he had ever seen – works that defined the city’s unique character. Aghast, he asked why these voices echoing through the streets – voices of hundreds of artists and craftsmen – why do none of these voices have names? Where are their signatures? *Who created the Duomo?*

Although he was a painter and an architect himself (his best-known work, perhaps, is the Last Judgment in the cupola of the Duomo di Firenze) Vasari’s true vision was to establish a canon of art history, linking personalities and their cultural context to specific feats of artistic creation. Vasari sought to dust off the foggy anonymity that surrounded artists to his day. "There were built, then… many edifices of importance both in Italy and abroad, whereof I have not been able to find the architects," he wrote. Vasari lived at a time when world of art was devoid of identity, and he observed a “rudeness and little desire for glory,” in the men who had built and painted before him.

Vasari’s research led him to peer back one, even two generations, searching assiduously for the names and stories of his predecessors that were never recorded. Everything he discovered was through reputation and word of mouth, and when he could only find a name, he took it upon himself to conjure (often humorous) biographies. Vasari spent the rest of his life compiling what became the first art encyclopedia – a great biographic anthology of Renaissance artists, providing a trajectory from Giotto, through Brunelleschi, and up to contemporaries Michelangelo, Da Vinci and Raphael.
This, he called *Le Vite de’ Più Eccellenti Pittori, Scultori, e Architetti*, known in English as *The Lives of the Artists*. In the introduction, he wrote, “the works which constitute the life and fame of artists decay one after the other by the ravages of time. Thus the artists themselves are unknown, as there was no one to write about them and could not be, so that this source of knowledge was not granted to posterity.”³³ He succeeded in immortalizing those working before and around him, igniting a cultural obsession with the authorial artist – one that remains to this day. This has escalated to such a point that, today, the obsession with ‘originality’ (and the fear of the ‘un-original’ accusation) is hard-wired into architects from the beginning of their education.³⁴ In short, Vasari was the champion of ‘the author’ and *The Lives* was the genesis of a sea change in artistic production; his missive to posterity.

* * *

The history of human habitation is an untold epic of anonymous architecture: the nameless vernacular is a cultural expression of man’s need, not only for shelter, but also for status, identity, and delight. In 1965 Bernard Rudofsky completed an epochal study of what he called ‘non-pedigreed architecture,’ presented as a book and exhibition for MoMA titled *Architecture Without Architects.*³⁵ Rudofsky’s project was at once an investigation, documentation, and celebration of vernacular architecture. The idea was polemical for its era and place in the heyday of modernist New York; Rudofsky leveled a direct challenge in the face of the omnipotent authorial architect of his time.
Rudofsky’s work hinged upon a central thesis: building a compelling case for authorless architecture as a viable means of design that has existed for thousands of years in cultures across the globe. His work introduced a new strand of architectural theory; through photographs and drawings, *Architecture Without Architects* showed that primordial vernacular building could rival the work of modern individual designers in both aesthetic beauty and locally optimized functionality. Just as Vasari had done, Rudofsky was pioneering a new field of study in academia, and in a certain sense, was also giving a voice to the voiceless.

In the introduction to his exhibition, Rudofsky wrote “*Architecture Without Architects* attempts to break down our narrow concepts of the art of building by introducing the unfamiliar world of non-pedigreed architecture. It is so little known that we don’t even have a name for it. For want of a generic label, we shall call it vernacular, anonymous, spontaneous, indigenous, rural, as the case may be.”

Dutch architect and theorist N. John Habraken described same phenomenon with the term ‘natural relation’, that is, “the age-old settlement process where habitation and built form are one.”

This could not be farther from the entrenched persona of the heroic modernist architect. Just as the discipline was ossifying into the rarefied formal precision of high modernism, Rudofsky trumpeted the underground cities of Tungkwan, China, or the cliff dwellings of the Dogon Tribe in West Africa.

He did not intend to provide an encyclopedic review of non-pedigreed building, but rather to dismantle the boundaries imposed by commercial, authorial architecture, and prove the validity of informal design. “It is frankly polemic, comparing as it does, if only by implication, the serenity of the architecture in so-called underdeveloped countries with the architectural blight in industrial countries... There is much to learn from architecture
before it became an expert’s art.” He concludes that the slow trial-and-error process of adaptation offers a rich potential to achieve locally and culturally optimized architecture, and that this process predates humanity itself. “It seems that long before the first enterprising man bent some twigs into a leaky roof, many animals were already accomplished builders. It is unlikely that beavers got the idea of building dams by watching human dam-builders at work...”

At the root of Rudofsky’s catalogue of anonymous architecture lies a fundamental question – the origins of architecture itself. The author states it bluntly, “Since the question of the beginnings of architecture is not only legitimate but bears heavily on the theme of the exhibition,” he wrote, “it is only proper to allude, even if cursorily, to possible sources.” Every ur-example he gives is a form of collective architecture - the act of building as a natural expression of culture - each a characteristic adaptation to a specific climate, environment, or topography. This is distinct from the idea of ‘architect,’ and begs a central question of how to tell the history of architecture whilst acknowledging that architecture is a relatively minor and recent cultural invention - an intellectual position that Bruce Mau would later echo: “the history of the world of design is not the history of the design of the world.” The evolution of building was shaped not by architects, but by the same forces of economics, politics and technology that shaped everything else and existed long before the idea of the ‘architect’ was conceived. Habraken went as far as to characterize the built environment itself as organic. “The term is justified because by a slow but continuous process of renewal, improvement, and adaptation of individual houses, [cities] had a self generating ability. Houses functioned like living cells of a fabric.”
The conclusion is that architecture is intrinsically sociable: fixed structures (and, eventually towns and cities) coalesced as humanity moved out from the individualistic morass of nomadic hunter-gatherer culture, notes Alex Haw. When prehistoric humans collected resources it was most beneficial to remain as distant as possible, but when someone has a nut you’re willing to trade berries for, things start to change. Rudofsky imagined what could be gained by considering that genesis-condition, and charting the trajectory that proceeded from it. City-forming, he found, happened with the advent of agriculture and the beginnings of economy – labor became specialized, and objects acquired value beyond sustenance. From that point of origin, there is a clear developmental history of cities for thousands of years: it is a story of collective action, where sociability contributes more to the momentum of culture than individual action could.

Rudofsky was not alone in articulating the communal, cultural and transformative genesis of cities – other voices soon joined his, prominent among them that of historian and sociologist Lewis Mumford. “The chief function of the city is to convert power into form, energy into culture, dead matter into the living symbols of art, biological reproduction into social creativity.” In his expansive study of the evolution of urban space, The City in History, Mumford considered architecture for its social value, rather than as a creative form or as a technological novelty. At a time when the cultural zeitgeist was eulogizing its triumphant leaps in scientific advancement, Mumford “argued that language and communication were the essential elements of civilization and that the city, where all kinds of relationships could be established, was in fact the great invention of society.” Urban space, then, is a story of humanity and how built form responds to it. Physical buildings represent abstract social functions: for example, palaces are intrinsically tied to government, temples to religion, and
market halls to commerce. Over time, each is spun by an intricate web of culture, tradition, and human interaction.

The reciprocity between culture and built environment is best described as *civitas* and *urbs*, two words that represent an ancient distinction between, on one hand, the religious, political, and social aspects of a city, and on the other, its specific physical character. Italian scholar Marco Romano defines them as *moral citizenship* and *material citizenship*, and asserts that *civitas* and *urbs* are inseparably linked, like the palm to the back of the hand.

Yet the fingerprint of *civitas* is not only in landmark buildings and monuments. The city’s beauty – and the majority of its area – is in its anonymous structures. The metropolis is a sum of important and anonymous buildings, each contributing to the urban feel and texture – although, in a great inequity, the artistry of the vernacular city goes unrecognized. *Civitas* and *urbs* actually identify the very same condition that appalled Vasari, centuries ago. To him, it should be the *artifex* that creates *urbs*, not the collective tide of *civitas*. In contrast to Vasari’s author-model, the unique character of a city is the result of a vibrant social architecture, “a communal art, not produced by a few intellectuals or specialists but by the spontaneous and continuing activity of a whole people with a common heritage, acting under a community of experience,” as architect Pietro Belluschi described it. Its motive force is tradition, the aggregated weight of previous generations’ architectural output.

This social, relational architecture is a continuum of small acts of design, a “slow but continuous process of renewal, improvement, and adaptation of individual houses… a self-generating ability. Houses functioned like living cells of the fabric. House types were never architectural inventions but came to full bloom by interaction.”
The role of the architect, then, is not to conceive of and build form, but rather to observe the built environment and seek to understand his role in its inexorable advancement. Habraken described a process of architectural diagnosis: “we should recognize that the built environment is an autonomous entity, that has its own ways, and the architect should study that and explain how and why he can participate in a largely autonomous process.”

The pinnacle of this ‘communal art’ arrived when a drip of catalyst – technical innovations in stone and graphic representation – fell into Europe’s thick cultural glue, yielding the great cathedral projects of the middle ages. In his extensive writings on cathedrals and their collective design process, William Morris speculated that any given project must have had some central impetus (an architect? a benefactor?) but one who is not “puffed up with individual pride” nor assured of his individual abilities. When the medieval architect approached building design, it was “the thoughts and hopes of men passed away from the world which, alive within his brain, made his plan take form; and all the details of that plan are guided, will he or will he not, by what we call tradition, which is the hoarded skill of man handed down from generation to generation.”

There is an predetermined set of strictures and traditions defining the ‘cathedral’ typology – cruciform plan, nave, aisles – with certain variables defined by the architect – number of spires, configuration of chapels – but the design (and construction) of any given component is the responsibility of a single craftsman-builder.

On an individual level, the artisan acquired a deep knowledge of craft – the limits of stone, for example, or the process of constructing a vault – from masons before or around him. This ad-hoc model was the basis of John James’ critical argument that
Chartres Cathedral, as a whole, conveys a sense of unity, but “when you examine the cathedral closely, you discover that the design is not a well controlled and harmonious entity but a mess… uniformity is the exception rather than the rule, inside as well as out.” The cathedral was, in fact, constructed in many phases, over a span of decades, and design decisions were made on the job. The result can be read as either dynamic or frenetic.

Even if such a reading of the Gothic collaborative construction process has been challenged by other research, Chartres cathedral was undoubtedly built through a multi-tier operational model (one that N. John Habraken or even Wikipedia would go on to follow centuries later): an open framework that leaves specific content generation up to its users. And the power of the crowd achieved results. Builders were not highly trained specialists, but common members of the community – they were the ones who would soon come every Sunday to worship in the very same cathedral. "They could not have had our genius-complex," wrote John James, “for they worked at what had to be done each day, without conceit."52 It was that attitude – community, collaboration, and lack of conceit – that suggested an ethical merit of Gothic architecture.

Hundreds of years later, when English society was gripped by the industrial revolution and a galvanic attitude of efficient production at the expense of individuals, architect and theorist John Ruskin emerged as a great champion of Gothic architecture, touting its moral superiority. He advanced his social-ethical-aesthetic convictions in a multi-part essay, The Seven Lamps of Architecture, pointing back in time to the medieval era as the paragon of beauty and truth in architecture. Two of the main tenets of architectural value (what he called ‘lamps’) were:

\[ \text{Life} \quad \text{... Now I call that Living Architecture. There is} \]

\[ \text{sensation in every inch of it, and an accommodation} \]
268 to every architectural necessity, with a determined
269 variation in arrangement, which is exactly like the
270 related proportions and provisions in the structure of
271 organic form.53

272 Memory ... And if indeed there be any profit in our knowledge
273 of the past, or any joy in the thought of being
274 remembered hereafter, which can give strength to
275 present exertion, or patience to present endurance,
276 there are two duties respecting Architecture whose
277 importance it is impossible to overrate: the first, to
278 render the architecture of the day, historical; and, the
279 second, such to preserve, as the most precious of
280 inheritances, that of past ages.54

281 Ruskin’s compendium of Gothic revival was popularly and
282 ecclesiastically well received. The Protestant Church endorsed the
283 idea that the style and the process of traditional medieval building
284 would promote morality. Also in keeping with Protestant thought,
285 Ruskin held that every man has an innate sense of aesthetic truth,
286 directly relating to his spiritual merit. "All men have sense of what
287 is right in this matter, if they would only use and apply this sense;
288 every man knows where and how beauty gives him pleasure, if he
289 would only ask for it when he does so, and not allow it to be forced
290 upon him when he does not want it."55

291 This is an architectural manifestation of Protestant ideals: every
292 man is qualified not only to appreciate design, but to create it. Just
293 as the Protestant Reformation empowered anyone to read scripture
294 and find truth without clergy, Ruskin preached an architectural
295 gospel of the common man. And, like the Protestant Reformation,
296 the idea caught fire and spread throughout Europe: embraced in
297 France by Eugène Viollet-le-Duc, in Italy by Alfredo d’Andrade
298 and Luca Beltrami, and becoming Europe’s epochal architectural
299 style. It was a full-scale movement, soon branded the Gothic
Revival (ironically, the very rhetoric that exalted the mores of collective design was being trumpeted by individual architects who continued to use modern processes of design and construction. Furthermore, the focus was myopically on who constructs, rather than the more important question of who pays\textsuperscript{56}).

Less than a century later, after the international convulsion of Modernism, non-pedigreed design gripped the broader architectural discourse of the 1960s. It became clear that the timeless way of building was not an anachronistic feature of modern man’s developmental past – far from it. To this day, communal design continues to trace a vibrant thread through human history and into the 20\textsuperscript{th} century. Notably, Peter and Allison Smithson spoke into this context, championing ideals similar to Ruskin’s. "We in Europe are ready for another architectural ordering that is in a way ‘Gothic’; that is, non-compositional, non-theatrical – an ordering we are calling ‘conglomerate,’” they wrote. “By this reading... a recovery of sensibilities that had been laid dormant by the overwhelmingly theatrical and graphic character of Italian Renaissance architecture.”\textsuperscript{57} The Smithsons’ work sought to access a pre-Vasari climate of artistic production by way of Gothic sensibilities, and the sum effect was collaborative.

Just as Morris, Ruskin, and Rudofky before them, architects of the 1960s were beginning to ask, “Why not have the courage, where practical, to let people shape their own environment?”\textsuperscript{58} (posed directly by a group of architects and theorists including Reyner Banham, Cedric Price, Peter Hall and Paul Barker, in their collaborative essay of the theory of “Non-Plan”). This simple question impelled a generation of architects and theorists, each offering a twist in flavor or emphasis or design-response. During the 1960s a flood of ideas were brought to the table - varying
degrees and means of participation, different boundaries of architect involvement, political or economic definition - but central to all was user empowerment.

It was in this milieu that Peter and Alison Smithson organized their open framework for a collectively designed exhibition, *Patio and Pavilion*. Peter Smithson described the project with the same operative terms that were silenced by Vasari’s 1550 campaign for authorship: a return to bottom-up design. Decades later, Beatriz Colomina observed that *Patio and Pavilion* was, in a sense, “an ephemeral, un-heroic reply to Le Corbusier’s *Pavillon de l’Esprit Nouveau* of 1925, by which Le Corbusier proposed his Plan Voisin.” As they ceded aesthetic control to the practitioners around them, the Smithsons embodied the self-effacing anonymous architect who had been pushed to history’s sidelines by the Promethean designer.

N. John Habraken spun the idea slightly differently, suggesting that participatory and flexible design could be achieved by separating structure and infill. He created a ‘plug and play’ system, where the architect delivers hardware (structure) and sits back to watch as users inject their immediate habitation environment. Yet the idea is more nuanced than a building-scale cubby hole, becoming what Yositaka Utida termed “three dimensional urban design.” The essence of the concept is the separation of the individual from the collective, the part that changes frequently from what is more stable. This equates with the distribution of control: control of the unit versus control of the public part. The boundary between the two can vary, as can the identity of the controlling groups – but a balance between them is the essence of Habraken’s idea of ‘Natural Relation.’ It was an elastic and evolutionary response to ideas of collectivity which also had repercussions in physical, material space (the framework and contents). In Habraken’s model, the architect
provided a system, and inhabitants would appropriate and respond to it. It is a user-driven interactive architecture that operates on multiple time scales.\textsuperscript{61}

Compelling ideas, but still quite pragmatic. British architect and provocateur Cedric Price took idea of interactivity and sensationalized it. Architecture became loud, fun, hip, and constantly evolving. Price understood buildings as a venue for interaction, a dynamic \textit{scene} that can provoke events and networks, and where "delight" is the operative word, encompassing emotions from creativity to pleasure to shock. In a short essay on Cedric Price, Hans Ulrich Obrist credited the appeal of his work to "Flexibility, responsiveness, transience, relativity, joy. Championing these as the principles of urban design, the freeing of the human within the structure, in opposition to the engrained doctrine of unyielding, static, constrictive architecture."\textsuperscript{62} The building itself is continuously determined by the users, while the contribution of the architect is to create an infrastructure that anticipates by giving access to (or enforcing) a capability which might not yet have been asked for: "like medicine, architecture must move from the curative to the preventative."\textsuperscript{63}

He is best known for an unbuilt project, designed with Joan Littlewood, called \textit{The Fun Palace} – a giant framework-machine, schematically coded like a piece of responsive electronic circuitry and driven by the engine of human delight. “Its form and structure, resembling a large shipyard in which enclosures such as theatres, cinemas, restaurants, workshops, rally areas, can be assembled, moved, re-arranged and scrapped continuously.”\textsuperscript{64} What was most remarkable about Price’s work – particularly standing shoulder to shoulder with his peers Reyner Banham and Francois Dallegret, or Archigram – was the lack of interest in graphic visual communication, focusing instead on social criticism and
provocation or posing questions and offering unexpected answers.\(^{65}\)

A later (also unbuilt) project, *The Generator*, is a more pure expression of Price’s cybernetic ideas. The architect was commissioned to create a retreat and activity center for small groups – the perfect brief to apply his concept of an interactive built environment. He devised a system of 150 pre-fabricated cubes, each 12x12ft, which users could shift and reconfigure. Not only that, but a primitive digital software detected stasis: if the building remained stagnant for too long, it automatically executed *The Boredom Program* to spontaneously reconfigure the structure and incite (or perturb) users. The architecture itself took an active role as a provocateur, with the aim of enhancing human experience.

For Greek architect Takis Zenetos, this suggested a logical continuation: what if experience itself became architecture? Familiar structural forms disappear, becoming, instead, a kind of human-derived network. *Zenetos’ Electronic Urbanism* took Price as a starting point – his notions of dynamic planning for the future society – but rather than a sensational architecture of delight, Zenetos leveled a sharp focus on contemporary debates within Greek society and economy during the 1960s.\(^{66}\) *Electronic Urbanism* was directly inspired by science magazines of the time, and proposed a network of overhanging cities as tensile mega-constructions based on a flexible grid that would gradually cover the Earth’s surface. Zenetos foresaw the impending telecommunications networks that would lace the globe, and proposed what was, arguably, architecture-as-telecom infrastructure. “The structure of the city and the house of tomorrow will be fleeting almost something fluttering and whenever possible, inmaterial.”\(^{67}\) Similar to Constant Nieuwenhuis’ contemporary *New Babylon*, Zenetos imagined man’s future as a
neo-nomadic society inhabiting a dynamic space where links and interactions become more important structure.

Like the Smithsons, Price and Zenetos, Italian architect Giancarlo de Carlo sought to reconcile modern life and architecture, working towards desirability and the creation of scene. “We have not yet built the places ‘where it can all happen,’” he wrote, in an essay for Alison Smithson’s Team 10 Primer, implying that architecture was still ill-fitted to contemporary social patterns. Yet rather than offering an open-ended system, de Carlo scripted dynamism into the architecture itself. “What draws us to Paris is the still-live sense of the city as a collective art-form... A connection we have now lost. We can rebuild that connection only from the associations of people with places we know to be alive.”

He vividly described an organic architecture – that is, architecture-as-organism – which would live and breathe with its inhabitants. Rather than expanding additively, it would be organized first on the collective, regional level, and work inwards to the basic cell units of individual needs.

He saw the distinction between urbanism and architecture as counterproductive, and in blurring the two, worked against the stereotype and endless repetition of modernism. While his theory did not allow flexibility for the users to change and manipulate the architecture themselves (de Carlo believing that such dispersed processes are inefficient and produce poor results), he instead used research, empirical data and a biological analogy to create intricate regional systems. De Carlo believed that intensive research of human patterns, both historic and contemporary, could be distilled into a more effective, human, and desirable architecture based on relational infrastructures. Users would, in a sense, ‘design’ the architecture simply by their patterns of habitation that would inform the architect. “Only the assumption of clear ideological positions and the application of rigorously scientific procedure can guarantee a legitimate political and technical framework. Then new
objectives can be set and new practical instruments be developed to produce a balanced and stimulating physical environment.”

Architect became anthropologist, and organic form emerged from his rational analytic processes.

“Methodological investigation on collective forms has seldom been done until very recently,” wrote an architect on the other side of the globe, predating de Carlo by only a few years. “What is needed is not just observation and critical comment, but utilization of the observation to develop strategic tools in making our physical environment.”

In 1964, Japanese architect Fumihiko Maki issued this call-to-arms, sparking a new approach to architectural planning on the regional scale. It was this basic precept that drove a coalition of young Japanese radicals, including architects, politicians, designers and economists, to form the Metabolist Movement. As a response to the nation’s post-war economic growth and population boom they posited visionary plans for growing, changing, metabolic structures. Architecture must keep up with the pace of society, they argued, and buildings would do so by genetically propagating ad infinitum.

“The force of contemporary urban characteristics makes it impossible to visualize urban form as did Roman military chiefs, or Renaissance architects Sanallo and Michelangelo; nor can we easily perceive a hierarchical order as did the original CIAM theorists in the quite recent past. We must now see our urban society as a dynamic field of interrelated forces. It is a set of mutually independent variables in a rapidly expanding infinite series... Our concern here is not, then, a 'master plan,' but a 'master program,' since the latter term includes a time dimension.”

Much like an organism, architecture would respond to the pushes and pulls exerted by a matrix of socio-dynamic forces that surround it. Metabolist structures used biological models, achieving dynamism...
through, for example, spine-and-branch arrangements, or cellularly subdivided megaforms. The architect would establish a system – a master program – that could propagate itself in response to the subsequent social requirements. Maki’s early ideas point towards today’s contemporary research in ‘self-organization,’ the branch of biology that investigates the self-organizing dynamics of cells and tissue (which can, in turn, provide a concomitant architectural metaphor). As is biology, Metabolist architecture is structure as patterns, aggregation and expansion.

If habitation can be solved with patterns, could a single, robust theory of pattern language extend beyond the bounds of architecture? Could applied mathematics arrive at the same flexibility and beauty that Rudofsky documented, that Price and Zenetos shouted for, that de Carlo and Maki researched, and that the Smithsons and Habraken orchestrated?

Christopher Alexander, an iconoclastic mathematician turned designer turned activist from Berkeley California, began his work with a seemingly naïve observation – that medieval towns are irregular yet harmonious. With the eye of a mathematician, he interrogated the relationship between guiding regional strictures and the infinite variety that is possible when the architect is free to adapt to a specific site or condition. Once again, he had stumbled upon the collective phenomenon, what he called the timeless way of building.

“There is one timeless way of building. It is a thousand years old, and the same today as it has ever been. The great traditional buildings of the past, the villages and tents and temples in which man feels at home, have always been made by people who were very close to the center of this way. It is not possible to make great buildings, or great towns, beautiful places, places where you feel
yourself, places where you feel alive, except by following this way.”

Alexander worked to reconcile this human sociability with mathematical patterns, models that would offer a practical generative grammar for building. “These tools allow anyone, and any group of people, to create beautiful, functional, meaningful places... You can create a living world.” A linguistic system for urban networks is based on mathematical models, but takes a strictly non-masterplan approach: individual units are subject to local rules. This is the way humanity has always built.

A living world. A dynamic field of interrelated forces. The city as collective art form. Despite their differences, each of these architects added to the momentum building an exaltation of the anonymous architect. Their final conquest – the last voice to be drowned by the collective shout of participation – was the unshakable author, the bastion of rhetorical architecture himself. Le Corbusier.

* * *

The Swiss built a career atop the edifice that Vasari had begun constructing 400 years before him. With his authorial hand, casually gesturing towards a new world and a new spirit, Le Corbusier announced absolute control of society and its design. It is what Haw characterized as “narcissistic naked aggressive macho individualism.” During the process of creating his epochal project, the Pavillon de l’Esprit Nouveau, he was commissioned by Henri Frugès to design industrial worker housing in Pessac. He brought the same authorial mentality to the project, Les Quartiers
Modernes Frugès, and used it as a case study for his Five Points of Architecture. Le Corbusier described the project as a “laboratory of new domestic, structural and aesthetic ideas… Pessac was built as experimental ‘worker’s housing.’” It was organized as a standard grid structure – each building designed as an assemblage of universal (almost snap-together) components, and as a whole, each fitting into the larger plan like pieces of a puzzle.

So far, Pessac appears to be a reconfirmation of Le Corbusier’s singular vision, with its pilotis, standardization, and free plan – yet the project’s modularity proved to be its Achilles heel. Le Corbusier had created an unexpected alchemy at Pessac: it could be configured and reconfigured into any organization… and it was. In the hands of the tenants, standardization became the key to effacing the architect’s deterministic plan. The families of Pessac took full advantage of the flexibility built into their dwellings – walls were moved, re-moved or extended, huge (Corbusian) swaths of glass were replaced by sensible little windows with curtains and flower boxes, indoor spaces became outdoor and vice versa. In short, Modernism – in all of its white, cubic purity – was decisively shattered. Or rather, it was accessorized.

In elite architectural discourse, Pessac is considered a failure. Thousands of students in Architecture History 101 courses see it lumped into the lesson plan on St. Louis’ Pruitt-Igoe (a 1950s modernist housing project, where ultimately, the only solution to violence and squalor was to dynamite the buildings to rubble). Pessac’s dynamite was frilly curtains and Midi-kitsch, but it amounted to the same. Pessac and Pruitt-Igoe are proof of the cold, inhuman sterility of architecture; these are where a totalizing doctrine went sour.
Yet, this conclusion was questioned by French architect, Philippe Boudon, in an incisive 1972 study titled *Lived-in Architecture: Le Corbusier’s Pessac Revisited*. Boudon reconsidered the project, bringing it into a new, more humanist light. In an exhaustive anthology of photographs, narratives, critical and press responses, interviews, and discussions, he emphasized the agency and significance of Pessac’s inhabitants. “The Quartiers Modernes Frugès were not an *architectural failure,*” he wrote. “The modifications carried out by the occupants constitute a positive and not a negative consequence of Le Corbusier’s original conception. Pessac not only allowed the occupants sufficient latitude to satisfy their needs, by doing so it also helped them to realize what those needs were.” Architecture disappeared under a palimpsest of every-day life – could there be value in that very process? After Le Corbusier signed and submitted the plans, the project fermented, and half a century later Boudon uncorked a heady brew of user empowerment.

The sum total is that Boudon graciously provided the deadliest irony: *Pessac* wasn’t a failure, he said, it was a triumph of collective design! Le Corbusier’s method, his manifesto, his very conception of architecture – *that* was a failure. And suddenly Pessac became the final battleground of an ideological war: closed masterpiece or open system?

Critics and theorists fired shots from both camps, but Boudon’s *Pessac Revisited* was effectively the final nail in the clean, white coffin of authorial design. Ada-Louise Huxtable reexamined Les Quartiers Modernes and added her voice to the cacophany, grafting Le Corbusier’s iconic words back onto the project, “Le Corbusier once said, in a statement usually turned against him, ‘You know, it is always life that is right and the architect who is wrong.’ This was not a confession of error. It was the recognition of
the validity of process over the sanctity of ideology. Few architects are capable of making that observation, because it speaks not to some fixed ideal, but to the complexity and incompleteness of architecture, to how life and art accommodate to each other. And that is what Pessac is really about.”

Huxtable summarized her impression, “I have been to Pessac to see the future and contrary to popular belief and the conventional wisdom, it works.” A compelling liqueur of non-pedigreed architecture.

The families of Pessac had dealt a deadly blow of kitsch to Le Corbusier’s pure architecture, and when critics like Boudon and Huxtable spun the carnage in a positive light they achieved nothing short of the final dismantlement of Le Corbusier and the ideology he represented. The Swiss was dead, but he had created something spectacular and unexpected at Frugès. Ultimately, “there is no sense of ‘the architect’s will imposed,’ or of an unyielding, authoritarian design. The houses rolled with the punches” – a fine result of interactive alchemy and bold inhabitants, but the question that remained was whether such flexibility could be designed from the beginning. Could the dream of participatory architecture ever blossom into a functional operational model, in the same way that authorial design (however flawed) had been?

The simple answer is: no. Even today, almost 50 years later, it doesn’t seem so. That energy, the white-hot ideas of collective design that razed modernism and had architects and theorists from Price to de Carlo buzzing, had all but fizzled out. The convivial Gothic mentality, the interactive ‘Fun Palace,’ the generative pattern languages… why didn’t it all come true?


ibid

ibid


ibid

ibid


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ibid

William Morris


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Peter Smithson.


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Why It Did Not Work: A Horse Designed by Committee

Participation will create chaos.
— Christopher Alexander, *The Oregon Experiment*, 1975

* * *


The sentiment is nothing new – there is evidence of it long before radiation and cell phone towers. Its proto-form was probably NIMT (Not In My Tree) or NIMC (Not In My Cave), but our story
begins with NIMEY (Not In My Estate Yard). The year is 1833, and the estate in question is Clement Clarke Moore’s Chelsea Estate on the western edge of Manhattan Island. The city of New York had recently passed the Commissioner’s Plan of 1811, which proposed a new Ninth Avenue running directly through Chelsea. After unsuccessfully protesting the urbanization of his land, Moore was considering an attractive offer of $40,000 dollars for the whole of Chelsea. At the last minute, James Wells (the founder of America’s first real estate office) convinced him to retain ownership of the land and to parcel it out into individual development lots. By 1835, Wells had drawn a preliminary street plan for the newly incorporated area and became an investor himself, purchasing an office at 191 Ninth Avenue. Wells’ proposal was a vision of participatory development – as the land was sold to individual owners, it would be collectively built up into a thriving town. The process wouldn’t be entirely organic – it was, after all, privately owned land, and “all kinds of Nuisances will be prohibited,” Moore reasoned. To guide Chelsea’s growth, he and Wells established strict regulations on future construction (essentially, proto-zoning) and he reserved the right to approve or deny any project.

Not strict enough, it seems. By 1845, a mere five years after the land was sold, several disgruntled owners complained to Moore for approving the construction of “small unsightly frame buildings,” near their own lots. The worst blight of all, they said, “to cap the climax of injustice,” was a carpenter’s shop on Ninth Avenue. A letter addressed to Moore and Wells stated that the shop “thus materially depress[ed] the value of all property in the immediate neighborhood,” and constituted an “express violation of your own assurances to us.” Communal design had worked perfectly, until too many incompatible voices and ideas came to the table, leaving
only a single piece of common ground: a great collective shout of “Not In My Back Yard!”

* * *

The wisdom of the crowd, the challenge of herding cats, and the NIMBY mentality that locks it all into stalemate. In any collaborative project, the difficulty is in maximizing participation while maintaining a clear order and a unified focus. Christopher Alexander offered a model of participatory design, showing that what he called the timeless way of building can yield powerful results. And what better place to test his theory than a thriving community of bright, engaged intellectuals who cared about their physical environment?

This was the kernel of The Oregon Experiment. During the 1960s and 70s, the University of Oregon campus was crackling with activist energy. Student groups were publicly engaged with national affaires – including the United States military draft, human rights in Nepal, and policy regarding the Vietnam War – as well as local matters – the destruction of a cemetery built in the 1800s, Oregon-based industrial logging, and ROTC involvement at the university. The critical student body also railed against the campus itself: a scattering of WWII-era Brutalist housing blocks that they decried as a concrete entrenchment of archaic pedagogy and social views. Students protested the structures of the university, both physical and ideological, and called for an administration that took into account their own voices and provided a hospitable environment.
Their champion was Christopher Alexander: the rare kind of architect who, given a masterplan brief, would choose not to design buildings, but a mathematical, grammatical pattern language. Alexander worked to create a system that could integrate the users (specifically the disgruntled and active student population) with planners, designers, and administrators. The key was a language based on a non-technical and non-specialist vocabulary of design principles. It wasn’t mathematics, exactly – it was a functional tool for discussion. This new methodology would “define a pattern as any general planning principle which states a clear problem that may occur repeatedly in the environment, states the range of contexts in which this problem will occur, and gives the general features required by all buildings or plans which will solve this problem.” In effect, Alexander was offering a radical new approach to designing best-fit yet cohesive environments for a large community of stakeholders, one that would allow decisions to be made continuously by the entire group, rather than be guided by a strict, original, and singular masterplan. Alexander’s Pattern Language would be the flexible glue that held an evolving campus-scale project together.

“But of course, in order to create order, not chaos, people must have some shared principles. Nothing would be worse than an environment in which each square foot was designed according to entirely different principles. This would be chaos indeed. In our proposal, this problem is solved by the use of the shared ‘patterns’... These patterns give the users a solid base for their design decisions. Each person and group of people will be able to make unique places, but always within the morphological framework created by the patterns.” As the saying goes, a camel is a horse designed by committee, and Alexander’s entire system existed to mediate and strike a balance between innovation and chaos. He built in protection against the latter, structuring his
pattern language to prevent disorder, and taking for granted a motive force of engaged students, vibrant discussion, collaboration, and participation.

But he had wagered on the wrong cards. Decades later, the majority of the student body had no idea that the university was carrying out a planning experiment. The Achilles heel of the project – one that Alexander had not anticipated, despite the sophistication of his pattern language – was the difficulty of attracting stakeholders to the actual, nitty gritty, raise-your-hand-and-vote process of making decisions. His linguistic system worked so hard to make a seamless and flexible participatory process that it did not account for student apathy. Soon it became clear that the only way to arrive at a conclusion in campus planning was to address the issue in a targeted group, meaning that vast numbers of stakeholders might never hear about a decision, let alone weigh in on it – finally rendering the participatory system irrelevant. With each year that passed sans broader student input, Alexander’s pattern language withered.

In 1994, architecture critic Greg Bryant returned to the Oregon Experiment, observing that, “the democratic safeguards, the annual reviews and diagnoses, have disappeared. Campus planners blame this on a lack of resources, but these events could be organized by faculty and students. Only a handful of people are now involved in what’s left of the process. Some find it empowering, but others quickly find its limits.” Alexander had built safeguards of community control into his pattern language to protect against the undue influence of bureaucracy, administrative power and financial leverage. Arguably, this was a flexible and evolving framework, and the system itself could have generated that shift – as Giancarlo de Carlo wrote decades earlier: “collective participation introduces a plurality of objectives and actions whose
outcomes cannot be foreseen…” one of which may, in fact, be the self-destruction of the system itself. But the net result was that the original vision of energetic community participation had been lost. The only thing Alexander couldn’t protect against was indifference, and at the outset of the project – on a campus that had been buzzing with pent energy – it wouldn’t have seemed necessary. In his revisitation of the Oregon Experiment, Bryant wrote that the students “are apathetic… because no one asks them anything. The administration does not generally give to the campus community the political power to make decisions.”

After two decades, the Oregon Experiment was either dead or mutated into the ideological antithesis of its original intention. Christopher Alexander returned to the task of integrating users and balancing conflicting agendas in a later book – titled nothing less than The Nature of Order III – in which he considered the idea from the perspective of builders and administrators. Particularly in the context of large-scale projects, he concluded that the process is “a political and administrative nightmare.” Democracy could result in either bland stalemate or fruitless chaos – The Oregon Experiment produced a lowest common denominator, and the only recourse was to continue the University’s bureaucratic status quo. In a sense, the outcome was unsurprising. “No wonder participation by users is so often refused by administrators – in buildings and in towns,” wrote Alexander. With his Oregon Experiment, he had squared off against a monumental challenge, and it had proven impossible.

Could there be a solution to both apathy and anarchy? The idea of the Oregon Experiment had been good, thought architects, but the execution failed. One response, most vocally from Nicholas Negroponte and the MIT Soft Architecture Machine Group, was to schematize participation, essentially turning it into software. Much
of this burgeoning discussion took place at MIT, where lines blurred between computer science and architecture, then as now. Eager talk of computing, programming, machines, and generative code was flying thick in the air, and architects were breathing deeply. *Style* was swapped for *science* and a new breed of design emerged, based on what Herbert Simon called – in his *Sciences of the Artificial* – “a body of intellectually tough, analytic, partly formalizable, partly empirical, teachable doctrine about the design process.”94 The goal was a non-chaotic system with categorically guaranteed user input for the maximum efficiency of user-derived output.

Moving beyond the disorganized barn-raising mentality, a new, complex theory of collaboration was emerging through the implementation of technology. In 1965, Bruce Archer – one of the pioneers of design as an academic discipline – summarized the burgeoning trend: “The most fundamental challenge to conventional ideas on design has been the growing advocacy of systematic methods of problem solving, borrowed from computer techniques and management theory, for the assessment of design problems and the development of design solutions.”95 The roots of this new design methodology had been sewn during the second world war, when an unprecedented amount of data – including governance, finance, personnel, tactics, propaganda, and nutrition, to name but a few – generated by the war effort required what became known as a new ‘systems thinking’ paradigm. Working in terms of interrelated networks of contingencies soon spread to architecture, and was the subject of several books, design initiatives, and academic conferences.96 In the broadest sense, this was a new science relating to the exchange of knowledge between nodes of a cybernetic system, and its insights could be applied to any discipline or specific challenge.
In the case of architecture, systematizing collaborative design seemed to be a surefire solution, bolstered by new technologies for computation. As the field was developed, however, the complexity of computational methods increased exponentially, and the discourse surrounding methodical collaboration soon became so esoteric and difficult to implement that it was irrelevant to anyone but the designer himself (and perhaps abstruse even to him). These new methods had become either a labyrinthine mechanism that ultimately dissuaded engagement, or a dumbed-down apparatus of compromise. UC Berkeley professors of design, Horst Rittel and Melvin Webber, framed it as a “wicked problem” in their essay “Dilemmas in a General Theory of Planning.” The phrase indicates, specifically, that systematic social design is difficult or impossible, due to shifting requirements and interdependencies that cause any given solution to result in additional problems. “It had to be acknowledged,” they determined, “that there had been a lack of success in the application of ‘scientific’ methods to design.” Often, such methods yielded nothing but a recognition of the lowest common denominator – arriving at a ‘satisfactory’ solution that does the least harm to the greatest number, rather than solving difficult problems. And if not, participation was strictly on the designer’s terms. The conclusion of a study titled Architecture and Participation (ironically, group-authored) was: “the strong feeling is that participation, or rather pseudo-participation, is being used as a socially acceptable shield behind which the authors can develop their technically-determined ideologies.”

The dream of collaboration and participation was a consummate failure in both cases – Alexander’s Oregon Experiment, and the computational theories of systematic design. Yet, as the authors of Architecture and Participation suggest, nominally cooperative projects, in any bastardized form, nonetheless continue to be a
useful tool for architects and administrators alike. Proof is in the
mark that Christopher Alexander left on the University of Oregon:
the planning principles of Pattern Language are ostensibly still in
place, forty years later... but only as a veneer for bureaucratic
decision-making. The university has institutionalized pseudo-
participation, to mild – if not completely effete – ends.

An entirely sanitized form of collaboration keeps the board happy
and keeps the students happy. In his book *Community
Participation Methods in Design and Planning*, Henry Sanoff
qualified this practice. “Pseudo-participation was categorized as (1)
Domestication: this involves informing, therapy, and manipulation,
or (2) Assistencialism: this involves placation and consultation.”

A select few have control, and the majority is complicit: they feel
involved, but don’t have to put in any legwork. The word
*participation* is clearly a powerful selling tool, regardless of its
problematic feasibility, and adds the weight of democratic
validation to any planning process. In reference to The Oregon
Experiment, Bryant wrote, “This self-deception, not coincidentally,
gives the administration unilateral control with a useful gloss of
community responsibility.” Essentially, the rhetoric of
participation is useful, but participation itself is not – and so
collaboration fades into irrelevance as it boils down to the same
top-down politics.

True participation, in the experience of N. John Habraken, is
deeply unpalatable for architects. He tells an anecdote of his work
in the 1960s, in the context of a ‘rhetoric of participation’– which,
he found, was ultimately an attempt by the professional architect to
stay in control. Empowered designers declared themselves ready to
listen to the people but jealously guarded the bottom-line design
decisions. “We rejected that notion, arguing that the user should
not participate in the professional controlled game but should get
control of his own,” explains Habraken. “The result was that we
were not trusted and got called technocrats because we pointed out
the material potential of our proposal. Even Giancarlo de Carlo
finally blurted out that in housing projects the house unit’s floor
plan could only be decided by an architect. The case of user control
still needs to be made in professional circles...”103

His response was to create a hybrid system in which various arenas
of control versus user participation exist side by side – or rather,
bottom-up design grows to inhabit and animate the cells of a larger
framework. Habraken developed a ‘natural relation,’ a theory of
mass housing based on a structure-infill system in tandem with
users, like a beehive’s honey to honeycomb structure. The power of
Habraken’s model is that the house unit – or work unit or any
minimum material element of the built environment – corresponds directly with the smallest social unit in a society. By
allowing it to be individually controlled, it becomes, once again, a
living cell in the organic built environment. A housing project can
be any size – the framework is extensible – yet it maintains its fine-
grained relationship to inhabitants as it dynamically changes over
time.104 Habraken developed his theory of separating support and
infill in a 1961 book Supports, An Alternative to Mass Housing,
making a compelling case for buildings acquiring the scale and
lifespan of cities. Whether Marxist or capitalist (Habraken was
accused of both), he boldly announced that such a separation in
architecture is “inevitable,”105 a feature of the autonomous built
environment.

Post-war Japan was also faced with a challenge of mass housing,
and arrived at similarly modular conclusion. The specific context
called for a new model of habitation befitting a society that, in its
own eyes, was poised to grow exponentially, not only in terms of
population, but also economically, culturally and in global
positioning. With this context as a motive force, a group of young architects, designers and politicians coalesced around the idea of *metabolic* architecture: an entirely new system that would expand and change and adapt to Japan’s explosive growth, maximizing the limited resource of physical space on the main island of Honshu.

The work of the Metabolists, as they came to be known, was propelled by the World Design Conference (WoDeCo) hosted by Japan in 1960. With the entire world as their audience, the Metabolists submitted a radical manifesto for the future, *METABOLISM 1960: Proposals for a New Urbanism*. During the following ten years, the Metabolists generated a prolific body of visionary habitation-concepts – although very few were ever built. Projects ranged in scale from buildings to sweeping mega-cities, seeking to multiply physical space by reaching up into the air, spreading out across the surface of the ocean, or plunging down to its farthest depths. Technology was central, and across the Metabolist movement its application ranged from towering helixes to extensive A-frames to vast floating webs. The architecture most often echoed a biological model, growing based on spine-and-branch organizations or replicating cellular-vascular ones. It was as if Habraken’s ideas for a natural order were put into electric, churning motion and propagated meteorically. The individual habitation cell became an infinitely replicable and biologically organized unit, driving the architect’s ego outwards into colossal scale.

Taking Japanese vernacular village organization as a starting point for his theoretical work, Metabolist member Fumihiko Maki presented a short essay titled *Investigations in Collective Form*. In it, he suggested the term ‘megastructure’ to represent any building-as-ecosystem that folds vernacular social organization into a single structure; a man-made feature of the geological and cultural
The example Maki held as a paragon of megastructure was Kenzo Tange’s 1960 *Project for 25000*, designed in conjunction with the MIT School of Architecture and Planning. The housing was proposed as two linear buildings of tremendous scale stretching out into the Boston bay; each composed of a fixed framework – the bones – and autonomous, rapidly interchangeable functional units – the cells. The buildings would be connected to each other and to the land by major highways, asserting the gargantuan scale and technological vision of the scheme.

These are all theoretical proposals, however a handful of realized buildings exist – Kisho Kurokawa’s *Nakagin Capsule Tower*, located in central Tokyo, is one of the few built examples of Metabolist ideas. It is conceived as a central spine, into which individual housing pods can be plugged and rearranged. Infinite combinations of pods and connections between them would allow for the creation of larger or smaller spaces; in theory, dynamically responding to larger or smaller family types. Yet just as the Capsule Tower distills Metabolist ideas, it also reveals a deep conceptual frailty: since the building’s completion in 1972, not a single pod has been shifted or combined.

The common features of Metabolist architecture were a certain dynamism and a scale far beyond what humans had ever proposed. And therein lay the problem. For all of the interchangeable potential and visionary structural innovation, these buildings were inhuman. By 1964, Maki had already criticized the tendency towards “structural virtuosity at the expense of human scale and human functional needs,” and the fallibility of the structure-infill system itself, observing that “if the megaform becomes rapidly obsolete, as well it might… it will be a great weight about the neck of urban society.”106 He envisioned a dystopian future landscape littered with gargantuan skeletons of disused megastructure.
Proposals were visionary, solutions were grand, but with the fundamental inhumanity of mutability and megastructure—let alone the economic and political barriers to implementing such vast urban projects—the Metabolist movement flashed out of existence just as suddenly as it had begun.

Yet the idea of megastructure persisted nonetheless. During the 1970s the model of a honeycomb-structure filled with cells for habitation continued to veer towards the colossal and dissociate from human proportion. Rather than following the progression of earlier so-called participatory architecture—becoming so effete as to be irrelevant or theoretical beyond implementation—these projects were uncompromisingly severe in both their conception and their appearance. They worked with the same scale and concept as Metabolism, but became starkly brutal: crystalline rather than organic. Corviale, a housing project on the outskirts of Rome, aggressively followed in the tradition of Le Corbusier’s Unité d’Habitation. Designed to be a comprehensive city-in-a-box that offered every social function—from schools to shops to chapels—with in a single massive structure. The intent behind Corviale was to alleviate congestion in the ancient Roman city center by creating an autonomous and self-supporting block of 1,200 apartments some 15 kilometers away from the downtown. Corviale was collaboratively designed in 1972 by a team of five Italian architects, Frederick Goria, Piero Maria Lugli, Giulio Sterbini, Michel Valori and coordinated by Mario Fiorentino.

As dictated by the architects, Corviale took the form of two parallel mirror buildings, 9 stories tall and a full kilometer long, earning it the nickname ‘giant serpent.’ A narrow cleft between the two halves was interspersed with open public areas and flanked by long interior corridors that tied the length of the building with circulation. Individual housing units were systematically and
densely packed throughout, with the fourth floor reserved as an interior shopping street.

In 1982, only months after the structure was opened (at this point, construction had not been finished, and is still not complete to this day), Corviale was already illegally occupied. More than 700 families squatted in the disused public areas and vacant storefronts of the 4th floor commercial district – a street now called the “flying favela.” It had been impossible to attract business into the illogically placed shopping arcade, and the partitioned shops became perfect (free) apartments for two, even three families – far more people than the space warranted, even if it had been meant for habitation. In lieu of retail, a much more thriving economy – narcotics, prostitution and other illegal activity – developed throughout the building. Conditions were dismally oppressive for inhabitants, who fought for what little light and private space the building offered. Designed with the vision of bringing natural sunlight down into an attractive and bustling pedestrian boulevard, the interior fissure was instead a sheer vertical face that dwarfed human proportion. From the exterior, Corviale was a stark, brutal gash across the Roman countryside, and within its walls, the project quickly became a festering beehive of human habitation. The same year he saw Corviale inhabited, the chief architect, Mario Fiorentino, died of the heart attack – though the pervasive rumor is that he committed suicide (a tale that proves public sentiment).

However horrifying, Corviale was not the only built attempt at megastructure during this time; it seems that a participatory mentality necessarily followed to the same conclusion in many simultaneous instances around the world. Peter and Alison Smithson responded to a similar brief in a similar context – a housing block outside of London – and devised a project that echoed both Corviale and the Boston Harbor housing. Like them,
Robin Hood Gardens, as it was called, was split into two linear concrete buildings, cupping public space between them. Like them, Robin Hood Gardens contained internal circulation paths (what the Smithsons called “streets in the sky”\textsuperscript{108}) that were meant to become vibrant thoroughfares. Like them, Robin Hood Gardens sought to foster a thriving community within a hermetic project. And like them, Robin Hood Gardens failed.

It was envisioned as a new housing typology, one that would demonstrate new analogues for elements of the traditional city — the house, the street, the neighborhood. With changes in modern transportation, for example, would come a new definition of ‘street’ – one without cars, yet nonetheless providing the age-old benefits of views, circulation, light and air.

Far from new paradigms, Robin Hood Gardens reaped nothing but accusations of “inhumane planning” and “social cesspool;”\textsuperscript{109} as low building quality became increasingly apparent, there was a simultaneous rise in crime and squalor. Complaints ranged from trash accumulation, leaking roofs, and overcrowded flats housing multiple families. Within years of its completion in 1972, tenants had already begun advocating for the building’s destruction – met by an equal and opposite preservationist campaign from city government (loathe, as they were, to financially invest in alternatives).

“People live in Robin Hood Gardens, like they live in a prison,’ said resident Charles Alison. ‘You could be walking along and all of a sudden you find something has hit you – an egg, a stone, a drink or cup thrown from the top.’ Fellow resident Obadiah Chambers said: “They should pull it down, without a doubt. They would not be pulling my home down because I don’t call it a home.”\textsuperscript{110}
Even Peter Smithson, when asked about the work in a 1990s interview, could not endorse Robin Hood Gardens. "In other places you see doors painted and pot plants outside houses, the minor arts of occupation, which keep the place alive. In Robin Hood you don't see this because if someone were to put anything out, people would break it... The week it opened, people would shit in the lifts."111

After numerous campaigns for the destruction and replacement of Robin Hood Gardens, the tenants – themselves its most outspoken critics – have finally made their voices heard. In April of 2013, after 41 years of poor conditions (what many would have described as squalor, crime, and a nearly-uninhabitable building), the process of demolition was begun.

* * *

Architects return, again and again, to the mechanism of participatory design – or rather, the rhetoric of participation is hung as an accessory on any kind of architectural project. Yet collaboration appears to be a treacherous foundation for the planning process, yielding a spectrum of results from apathy to anarchy.

But that isn’t to say architecture is without collective action. Far from it – the built environment is a powerful catalyst of the unified public. The Metabolists were a huge media success, far beyond what their built oeuvre would suggest. WoDeCo put their group in the global spotlight, Kenzo Tange appeared on Japan’s national television network, NHK,112 to present his ideas, and images of the Osaka World Expo – the last great Metabolist project – captivated
audiences across the globe. They charmed designers and non-designers alike with powerful visions of the future, garnering Japanese and international support.

In the case of Robin Hood Gardens (much to the chagrin of the architects) the most vibrant participation happened after the building had been completed and residents had moved in – taking shape as a vocal campaign for demolition. The future of the housing project was hotly contested in an evolving succession of media: letters, press, blogs, and finally Facebook and social media. Exposés showed squalor, while preservationists proudly cited Architecture (with a capital A), and cynics called it a moot point. The net result was dissatisfaction, and it quickly grew to become a full-scale movement for demolition.

In 2013, as bulldozers finally rolled onto the site, its failure was confirmed... but could Robin Hood Gardens in fact show the glimmer of a new paradigm? After 41 years of contention, it was finally the limitless and instantaneous connectivity of digital networks that tipped the balance, catalyzing residents’ engagement with each other and with decision makers. Physical proximity – which had been essentially the same for decades – was not as powerful as the energetic publics of virtual space. Could a new networked era yet provide connective tools to enact a timeless paradigm for participation?

81 ibid
ibid

82 ibid
84 ibid
85 ibid
88 ibid
90 ibid
92 ibid
93 ibid
96 “The Design Method” in Birmingham (1965) and ‘Design Methods in Architecture’ in Portsmouth (1967)
99 ibid


ibid


Smithson, Peter interviewed by Hutchinson, Maxwell. “Rebuilding Britain for the Baby Boomers, introduced by Maxwell Hutchinson, BBC Radio 4, November 2011.

Chapter 4

Learning From the Network:
Paradigms for Participation in the Digital World

How shall the new environment be programmed now that we have become so involved with each other, now that all of us have become the unwitting work force for social change? What’s that buzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzzing?
— McLuhan, The Medium is the Massage, 1967

* * *

On August 26, 1991, a 21 year old comp-sci student at the University of Helsinki sat in front of his home computer, wearing a bathrobe. For about five months, he had spent his free time toying with an alternative to MINIX (an education-oriented operating system). With the code nearing completion, he typed a quick
message into an online forum to ask for casual feedback: “I’m doing a (free) operating system (just a hobby, won’t be big and professional like gnu) for 386(486) AT clones.”

His name was Linus Torvalds, and he had just created the ‘kernel’ of an operating system – a seed that would grow into the paradigm-shifting Linux platform, and leave an indelible mark on the means and the ends of software production. As a student, Torvalds had simply been developing a tool for his own personal use, to facilitate access to the school’s large UNIX servers, but as it progressed, he quickly realized that he had created the foundations of something larger. By the end of the summer it was uploaded onto the school’s FTP server to ease broader distribution and development – initially under the name FREAX (although, unbeknownst to Torvalds, a friend of his invoked network administrator privilege and renamed it Linux).

As it gained steam at the university, the source code for the operating system was soon made free and public in 1992, under the GNU General Public License, to be changed, augmented, and developed by anyone with a computer and Internet access. To date, hundreds of thousands of suggested changes have been sent to ‘maintainers’ – Torvalds among them – to be implemented in the main Linux kernel. This piece of software has been built by a completely open and distributed team of developers…

And it works.

Torvalds adamantly believes that “open source is the only right way to do software,” a stance that is continually proven by Linux’ robust performance in both personal and commercial applications. Many banks today, for example, use Linux for security reasons and developers prefer it for its flexibility. It is an entirely new conception of design, what academic and sociologist Richard
Sennett calls “public craft.” With the staggering momentum of programmers worldwide pushing it forward, Linux has evolved in ways that proprietary software could never have done. It stands as a testament to the heterogeneous entities that assembled it – a million vibrant particles, amateur and adept, with a tangle of agendas and interests. The chemistry of a diffuse networked intelligence is a tremendous force of innovation and disruption, on a scale that humans have never worked before.

Torvalds remains involved in the project as a grandfather, of sorts, and embraces the dizzying heterogeneity of Linux. In his view, the maelstrom of voices and ideas and disagreements and innovations only serves to strengthen the final product. “To me, the discussion would be about how to work together despite these kinds of cultural differences, not about ‘how do we make everybody nice and sing songs around the campfire.’” The self-proclaimed “King of Geeks” envisioned Linux as the ultimate capitulation of top-down corporate software development. Never one to miss an opportunity for thumbing his nose at corporate culture, Torvalds — to this day — asserts his right to not wear a tie, to code from his bedroom and wear a bathrobe. “Really, I’m not out to destroy Microsoft. That will just be a completely unintentional side effect.”

* * *

Without rehearsing the threadbare rhetorical sparring between collectivism, communism and capitalism, it is still possible to delve into a larger discourse of human social systems. The work of Benjamin Franklin – father of a capitalist nation – expressly
engaged this tension. In addition to his role in writing and signing all four of America’s founding documents, Franklin was an insatiable creator; his œuvre included bifocals, swim fins, charting and explaining Atlantic Ocean currents, the urinary catheter, and the Franklin Stove… yet he held not a single patent. In today’s world, where everything from intellectual property to individual threads on a screw merits a patent, it is unthinkable that such a prolific inventor would loose his grip on proprietary ideas. In the case of the stove — a dramatic and marketable improvement on existing technology — Franklin was explicitly offered a patent. He wrote, in his autobiography, “Gov’r. Thomas was so pleas’d with the construction of this stove… that he offered to give me a patent for the sole vending of them for a term of years; but I declin’d it.”¹¹⁹ The only explanation that Franklin offered was one of pure altruism. Ideas, he thought, should be shared, tested and proved, for the benefit of whoever would use them. “As we enjoy great advantages from the inventions of others, we should be glad of an opportunity to serve others by any invention of ours; and this we should do freely and generously.”¹²⁰ Benjamin Franklin had adopted a truly open mentality. Rather than a top-down implementation of collaborative methods, Franklin was more interested in putting the product, idea, or process directly into the hands of the public. He was confident that humanity would be best served by the free and open ownership of his ideas, and happily allowed the public to actively change and augment them. To this end, he published his work in pamphlets, general magazines, and leaflets — most notably the Pennsylvania Gazette and Poor Richard’s Almanac — using his own printing shop. In 1731, he even opened America’s first circulating library, all the better to widely share knowledge.
The shared information ecology that Franklin imagined and worked to create was defined by means of communication – whether an almanac, town library or periodical. Throughout history, from governance to religious ritual to shared child rearing, the town has traditionally been a standard unit of social collective experience, its size defined by the extents of direct human contact. The invention and implementation of cultural products like language, cooking or architecture have always advanced slowly, over centuries, in the context of individual communities. The exchange of knowledge within the collective is activated by the invisible infrastructures of the relational social unit. Human tradition and relationships are the means, not only to transmit information, but also to expand, augment, and contextualize it. It is an evolutionary process, driven by face-to-face human action and interaction as a form of natural selection.

And then suddenly at the turn of the century, for the first time since the printing press, a new means of communication wildly skewed the neighborhood-metric by orders of magnitude: wireless radio. The elements of the village – whether social or functional – took on new reactive properties as they amplified explosively. Social media theorist Marshall McLuhan described this new human connective paradigm as a global village – an entire planet talking as if neighbors, suddenly given the tools to access each other’s ideas. Humanity had become ubiquitously and a-spatially connected. Yet it was different from village communication for one crucial reason: information was conveyed unilaterally. Radio is either received or broadcast radio – it is not conversational.

The term global village was perhaps inspired by a tradition of the Catholic Church, Urbi et Orbi, the city and the globe. This is the name of the Pope’s annual Easter and Christmas address to Rome.
and to the collective Catholic church body around the world, and – in the same way – it is monologue rather than dialogue. As he speaks directly to the audience, time and space collapse: individual nodes of the global Catholic network become instantaneously connected by his words.

McLuhan’s *global village*, however, does not point towards the cohesiveness of the Catholic church – far from it – he qualified the term with its inherent tensions. “The more you create village conditions, the more discontinuity and division and diversity. The Global Village absolutely insures maximal disagreement on all points. It never occurred to me that uniformity and tranquility were the properties of the global village. It has more spite and envy. The spaces and times are pulled out from between people. A world in which people encounter each other in depth all the time. The tribal-global village is far more divisive – full of fighting – than any nationalism ever was. Village is fission, not fusion, in depth all the time.”

Even if elsewhere in his work, McLuhan suggests a more polyphonic outcome, the global village often defaults to a forum for shouting – as if a planet filled with megaphones.

The emerging networked condition of the Internet era is markedly different. It is, of course, a wild west of conflicting ideas and ideals, but most importantly, it is a conversation. It returns to the original, age-old village metric. The Internet allows an *exchange* of ideas, not only a broadcast, and this particular cocktail of discord and collectivism can be remarkably productive, as proven by open source software. Linus Torvalds embraced the cacophony generated by Linux, believing that it ultimately enriches the final product. Today, the same energy that yielded vernacular architecture, gothic cathedrals and American barns is projected beyond the face-to-face, local scale and into the vast expanse of the
Internet. There is a proportional increase in disagreement and conflict, but – because it is a two-way exchange – it is productive.

As it developed, the Internet (or, more precisely, the World Wide Web) became a reflexive test-bed and workshop for a new kind of participatory design. The public it enabled autopoeitically came into being – people used the Internet to create the Internet (an artifact of simultaneous communication and substance). It was a phenomenon of connectivity, as McLuhan presciently observed, "The whole tendency of modern communication... is towards participation in a process, rather than apprehension of concepts." 123 Because it is entirely open ended, with no hierarchical structure save that of its constituent parts, the Internet became a 'wild west' of unbridled potential (and also, ironically, enclaves of control). Anyone and everyone could communicate, collaborate, create content or platforms and connect them to any other. “The number of such creations, circulations, and borrowings has exploded,” observed Christopher Kelty, “and the tools of knowledge creation and circulation (software and networks) have also become more and more pervasively available... All of these concerns amount to a “reorientation of knowledge and power.”124

And the most potent consequence of this reorientation, as far as Kelty is concerned, is Free Software – unambiguously free of both cost and ownership, the term Free Software designates a program whose source code (its constituent DNA) is publically available for addition, mutation, and implementation. The most remarkable quality of Free Software is not its potential for technical innovations – although those are plenty – but its dependence upon an active network of people who contribute enthusiastically. The key thing is that it is neither entirely altruistic nor entirely self-interested. As it flies in the face of conventional market norms, open sourcing becomes, on the one hand, an economy of
reputation, and on the other, simple pragmatism (Tovalds famously coined the quip 'Be lazy like a fox'). Altruism aside, it is simply inefficient to reinvent the wheel every time you want to design anything, and too expensive to do all the testing and R&D that the crowd will do.\textsuperscript{125} Collective production is a kind of non-monetary economy animated by transactions from amateurs to paid professionals, all choosing to share their end product.

Linux is perhaps the best example. Driven by an alchemy of motives, coders worldwide download, tinker with, improve, and re-submit code to Linux: estimates put the number of users well into the tens of millions. As of 2011, those users have written 15,000,000 lines of code, at an estimated cost of 3 billion dollars to develop by traditional proprietary (read: Microsoft-ian) methods. Open sharing communities, it seems, can dramatically outperform organizations with standard development methods.

As a result, major corporations have not remained blind to the groundswell of open source design. Netscape was one of the first companies to realize the possibility of harnessing the prodigious creative power of the world at large and responded with an unprecedented business decision. In 1998, the company released the source code for Netscape Communicator 5.0 to the public, with the hope of accelerating its development and broadening its operational potential. “By giving away the source code for future versions, we can ignite the creative energies of the entire Net community and fuel unprecedented levels of innovation in the browser market,” announced CEO Jim Barksdale. “Our customers can benefit from world-class technology advancements; the development community gains access to a whole new market opportunity; and Netscape’s core businesses benefit from the proliferation of the market-leading client software.”\textsuperscript{126} The result is a piece of software we now know as Mozilla Firefox, but the most
significant repercussion of Netscape’s decision was the explosion of *Open Source* as a concept into the global spotlight in 1999: the phrase appeared on the cover of Forbes magazine, the Free Software Foundation was founded, and open sourcing became the hot topic of political, economic, legal, and (of course) technological debate and practice.

What became obvious during the media boom was that Free Software is not only a productive collaboration model, but also a forceful political statement. It has come to represent an ethical and social position, encompassing questions of copyright and ownership, surveillance, trans-national corporations, and overarching systems of governance. Free Software has become analogous to free speech, free press, assembly, and petition: it is a means not only to express a political stance, but also to enact it. As Kelty said, it is “*a restructuring of knowledge and power.*”

Put simply, open source software has achieved an unprecedented level of technological sophistication through communal design, and it has caused a seismic tremor in the socio-political establishment. Most remarkably, it has done so on the engine of an alternate (non-monetary) economy.

These alternate economies, for lack of a better word, have emerged in myriad applications and disciplines – as enabled by the connective tissue of the Internet – and crowdsourcing has proven to be wildly successful as a means of developing them. Crowdsourcing, in a general sense, is the practice of soliciting content – whether ideas, actions or labor – from the public at large, in order to achieve a particular goal. Wikipedia, for example, has become a multilingual, crowdsourced digital juggernaut of information since its launch in 2001. It is within the conceptual lineage of *Encyclopædia Britannica*, the original leather-bound...
repository of all knowledge (and perhaps, even, a descendent of Tomas Aquinas’ Summa Theologica, begun in AD1265 and growing until St. Thomas’ death in 1274). Since its beginnings in 1768, Britannica was the first such document to operate under ‘continuous revision’ (a process of constant re-printing that was only officially institutionalized in 1933). But it is a closed system: Britannica’s board of editors is a discreet cadre populated by the intellectual elite, and its regenerative process operates on a scale of decades. On the other hand, Wikipedia – the young gun, Britannica’s unruly child – responds with a lightning-quick system of peer editing and review, in which content is generated and vetted by volunteers (that is, anyone willing to click ‘edit’) instantaneously. The running joke is that Wikipedia only works in practice… in theory, it is impossible. There is no compensation, and users freely offer their intellectual contributions, as both content and editing – once again, an economy of reputation and altruism.

In its wake, the foundational cultural institution of Britannica couldn’t help but capitulate to a rising digital tide; in 2012 – eleven years after the birth of Wikipedia – Britannica made the announcement that it would discontinue printing and segue to an exclusively online presence. Whether or not crowd sourced information makes rational or economic sense, the bottom line is that collective human knowledge is being poured into the Internet at an incredible rate, and it is changing the structure of human knowledge.

In these cases, the substrate of the sharing ecology is digital. However, the results of online crowdsourcing are not strictly confined to bits and bytes; digital networks are becoming a forum for physical objects and services through tools like Air BnB, RelayRides, Lyft and SnapGoods. The first rumbling, of course, was
eBay’s network of citizen retail, but today connective applications are becoming increasingly specialized and easier to use. And, inevitably, there is a simultaneous shift from sharing for free to sharing for a fee.

The greatest success story is Brian Chesky’s AirBnB—a project that started as a couple rented air mattresses during a San Francisco design conference, and skyrocketed into a multi-million dollar company. The site allows anyone with a spare room to snap a photo, set a price, list it online, and be connected with visitors in need of a bed – essentially to operate a personal hotel. Today, there are over 500,000 listings in 192 countries across the globe. And it isn’t just rooms. “We have over 600 castles. We have dozens of yurts, caves, tepees with TVs in them, water towers, motor homes, private islands, glass houses, lighthouses, igloos with Wi-Fi; we have a home that Jim Morrison used to live in; we have treehouses – hundreds of treehouses…” There was a period of time in 2011 when users could log on and rent the entirety of Liechtenstein, listed by Prince Hans-Adam II, for $70,000 a night. At first, the Internet allowed humans across the world to type out entries to a collective encyclopedia… now we are coming together to build the world’s largest hotel.

As yet, the most thriving sectors have been cars and housing, but collective consumption is spreading. There are constellations of services emerging around AirBnB and in parallel to it (house cleaning, taxis, personalized tours, car rental, etc) seemingly across every facet of society. A 2013 Economist Magazine article on the subject ran a humorous illustration labeled “Room, $38/night; Pickup truck, $9/hour; Hermès Birkin Bag, $100/party.” As the momentum builds, various projects have attempted to serve as consolidators of ‘collective consumerism’, as it has come to be called, because the success of an alternate economy ultimately
hinges on a critical mass of participants. The metrics are simple: once enough stuff is available online, it will become the most practical solution, because of proximity and variety, and its membership will expand virally. One such platform is Google Mine — a system integrated with Google+ that will allow users to catalogue, share, and track every single possession. “Google Mine lets you organize the things you own, use, wish for, and more: gadgets, clothing, electronics, DVDs, cars, bikes or anything!” Most importantly, it is a feature of Google’s social media network based on friends, relatives and co-workers.

That, precisely, is the crux of the sharing economy: it is social. It is less about quantifiable, financial, extrinsic gains and more about social gains on the order of reputation, so-called ‘sustainable lifestyle,’ and community-ties. Of course, from an individual standpoint, sharing is financially logical: network connectivity is increasing exponentially, while material resources are being depleted. It makes sense to save both. But the crucial point is, above all, socially desirability. Human action depends upon rewards, both financial and interpersonal, and collective consumerism emerges as a response to both, just as Linux was driven by a heady mix of altruism and aggrandizement. It is as if Thorstein Veblen’s theory of Conspicuous Consumption were turned upside down – becoming a no-less socially driven Conspicuous Collectivity. The standing of an individual within a collective is a powerful non-monetary reward, providing the necessary incentive for alternate economies. A 2003 scientific paper found that “social and environmental concern and action, it turns out, are based on more than simply access to the facts (a finding that may seem obvious, but has often proven difficult to fully acknowledge). In reality, both seem to be motivated above all by a particular set of underlying values.” And not just values, but also defaults and norms, as noted by Michael Sandel in his
work on the moral limits of markets. Modernity assumed that Industrial production and services can only take place within market norms; one disruption of the web is not just the empowerment of the long tail (the many small players as well as the few big ones) it is also – for the first time in modern history – that we are building production tools and services driven by social and cultural norms, in addition to market forces. Put simply, amateurism is going to scale. Vibrant ties within an active community are crucial – they constitute its substance and its action and they distill its norms. Sociability is the same ineffable force recurring throughout creative history, an intuitive system that reflects our ingrained need for interrelatedness.

Just as it did for open source software production and consumer economy, the Internet is shattering the boundaries of civic action. In addition to crowd-sourced software coding and crowd-sourced ownership, the Internet has made it possible to crowd source… a crowd.

The meaning of public action was thrown open by the events of the 2010 Arab Spring – a series of revolutions in the Arab world ignited by social media. The ubiquitous and instantaneous connectivity of tools like FaceBook and Twitter allowed ideas to spread like wildfire throughout a population, and for consequent protests to be organized in real time. A March 2011 survey revealed that during the course of the events, an overwhelming majority (88% in Egypt and 94% in Tunisia) used social media sites as their primary information outlet. Revolution itself was the overlay of digital networks onto the space of architecture and public action, and there it achieved gravity. Just as the cocarde tricolore was a potent spark in the French revolution, so to was #Egypt a symbol and a tool: it had 1.4 million hits in just three months (#Jan25 had
Collective action has the tremendous power to burn holes straight through existing social and economic fabrics, but can the same networks – the same networked mentality – be used constructively? August 2011 saw riots across the UK, sparked by altercations between citizens and law enforcement. Tension accelerated as dissidents quickly organized using mobile devices and social media, and the events soon came to be known as The Blackberry Riots. Yet in their wake, the same tools were applied in an entirely different way. The movement began with a single tweet by @sophontrack that suggested citizens respond positively to the chaos around them. The power of a simple idea. Following tweets from @artistsmakers, riotcleanup.co.uk was launched within minutes to establish times and locations for the cleanup operation, and soon thousands of people had aggregated into cleaning groups. Almost instantaneously, users of twitter linked through #riotcleanup and gathered in the same streets that had just been torn by violence. The momentum carried to cities outside of London and ultimately more than 90,000 people were involved cleaning the streets. #riotcleanup started not as an organisation - but an idea, an idea to change what was a downfall in society into something positive.

On the other side of the world, just months after political and social tensions erupted in 2013, the fiery conflict in Turkey’s Gezi Park left a vacuum of social agendas in its wake, but it had also created a tightly knit communal spirit. “Gezi helped awaken in many of us a sense of sharing and solidarity. It might be the best thing coming out of the protests and the following period,” said resident Aysu Erdoğan in an interview. Citizens acted on and nurtured the connections that had seared the city of Istanbul.
during protests, and bottom-up connected initiatives have gained a strong foothold through community-organized hackathons and forums. The mutual reinforcement of digital and physical connectivity has created a robust – and productive – citizen network.

* * *

In the 20th and 21st century, new tools of connectivity based on the Internet have dramatically expanded the dynamics of human action and inter-action. And those human connections refuse to linger sequestered in the cloud. Whether it is online sci-fi communities organizing a convention, spare bedrooms becoming hotel rooms, or engaged citizens fighting for their lives and liberties, physical space has proven to be vital counterpart of digital existence.

Bits and atoms are inseparably linked by human sociability. Today it is nearly impossible to remain unaffected by the Internet, and ordinary people are vigorously and innovatively creating physical, material, face-to-face tools for the networked era. The coder sitting next door in his pyjamas is writing the urban apps that may be implemented from India to Panama. Rallying cries of a new government begin as 140-character chunks. It is a paradigm shift on the order of the global village, but one that is connective and discursive.

This can only be described as a sea change in the scope of human interaction, sociability and global connectivity, one that has engulfed almost every facet of culture – save architecture. Why
can’t open sourcing, a methodology that commands almost limitless potential in the digital world (proven time and again by the likes of Mozilla, AirBnB, and the Internet itself), and which has existed throughout the history of architecture, have the same transformative effect on contemporary design and building practice? Where is the Linux of homes or offices or libraries? Page through any design magazine – you won’t find a building without a signature. The world of architecture circles on its well-worn orbit, seemingly outside the gravitational pull of networked participation.

Can architecture really remain aloof? The same energetic participation that drives Etsy, fantasy football and Tahrir Square could pump a collective vigor into architecture. The success of software is a direct provocation for architecture’s paradigm shift, orders of magnitude beyond that of the stone arch or steel-and-glass construction. How can the new tools of the architect bring people together – not only to inhabit, but to change, augment, and ultimately create the environment around them?

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Open Source Gets Physical: How Digital Collaboration Technologies Became Tangible

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On a blustery New England day in 2001, a knot of MIT researchers scurried across campus, down the staircase of building E14, and into a basement lab that thrummed with the energy of warm machines and white-hot ideas. They were part of a group of MIT students, professors, and researchers – including some of the
authors of this book – who spent their nights in a space with no official title but ‘the basement’ – a haphazardly assembled fabrication lab with a single goal: to create. Here, a hacker mentality launched ideas into physical space, with an assortment of laser cutters, vacuum formers, 3D printers and hypersonic waterjet cutters. It was a well-kept secret, the kind of equipment treasure trove that DIYers inhabit when they dream. Quite literally – the basement lab was in use at all hours of the day and night, and the people keeping an around-the-clock vigil became a close community of fabrication-minded innovators.

Close... and closed. As he observed from his office next door, Professor Neil Gershenfeld was concerned that this had become a secluded cult of fabrication, and was bothered by the limited accessibility of such a remarkable creative resource. An opportunity like this one – the almost limitless potential of using fabrication technology to jump out of binary and into physical space – should be open and free. Tools should be in the hands of whoever would use them, and Gershenfeld suspected that willingness might emerge on MIT campus. He was gripped by the notion of construction as education: “Constructionism’ asserts that people learn with particular effectiveness when they are engaged in constructing personally meaningful artifacts (such as computer programs, animations, or robots)... the idea that people learn by actively constructing new knowledge rather than by having information ‘poured’ into their heads.” Gershenfeld imagined that the basement lab, or something like it, would be the crux of a fabrication-empowered learning model.

Determined, now, to realize an idea that was beginning to take shape, the group of students, faculty and researchers who had coalesced in ‘the basement’ began collecting as many resources as possible – tools and machinery scattered about the MIT campus –
and simultaneously orchestrated a collaboration between the Grassroots Invention Group and the newly minted Center for Bits and Atoms. Within a matter of months (not to mention kickstart funding from the National Science Foundation), fabrication at MIT had gone from – literally – an underground operation, to becoming one of the most exciting programs at MIT: a digital fabrication laboratory, known as The Fab Lab.

In broad strokes, the Fab Lab explored the relationship between digital information and its physical manifestation. The overarching goal was to explore the potential of education-through-building and of bringing together bottom-up communities through technology. This was an unprecedented direction (within a traditional academic setting such as MIT), and an entirely new resource for people who would never have considered themselves ‘designers.’

A certain chemistry happened, between the buffet of equipment, new modes of learning, personal empowerment, and possibilities for tangible expressions of digital work: student interest erupted. When Gershenfeld announced a new class called How to Make Almost Anything, hundreds of people showed up for the first day. This simple idea of learning by making and crossing the digital/physical divide was generating a staggering amount of enthusiasm. In response to this overwhelmingly full booking of eager students, Gershenfeld began to turn his attention outwards. Considering that the opportunity for fabrication had provoked this much excitement on campus, what kind of response would Fab Labs find in the world-at-large?

In conjunction with the NSF, Gershenfeld began setting up similar spaces outside of MIT, and sparked a meteoric propagation of Fab Labs worldwide. “Instead of talking about it, I’d give people the
tools. This wasn’t meant to be provocative or important, but we put together these ‘Fab Labs.’ And they exploded around the globe.”

Fab Labs cropped up everywhere, from campuses to inner cities to rural villages, and the projects coming out of them were locally inflected in an entirely new way (at a Fab Lab in Norway, for example, shepherds put together radio-frequency ID tags for tracking wandering sheep). “There is really a fabrication and instrumentation divide bigger than the digital divide... We’re just at the edge of this digital revolution in fabrication, where the output of computation programs the physical world.” This was a new form empowerment – Fab Labs allowed people to modify or ‘hack’ the world around them, rather than passively absorbing information or products. As a result, ideas began gushing out of the quickly multiplying Fab Lab network. As people designed and constructed technology themselves, it became localized, instrumental, and practical. Even more importantly, as they were established, labs started hosting weekly classes, workshops and social events, becoming nuclei of design communities.

Propelled by the physical and social space of Fab Labs, a powerful idea – one based on a different understanding of education, experimentation and making – emerged from the dank MIT basement to become a worldwide network of citizen-empowerment. In 2006 Gershenfeld stood in front of a global audience at TED and stated: “The message coming from the Fab Labs is that the other 5 billion people on the planet [the poorest 99 percent] aren’t just technical sinks, they’re sources,” he said, “The real opportunity is to harness the inventive power of the world, to locally design and produce solutions to local problems.”

* * *

OSArc Open Source Gets Physical
The energy that created the Internet is a seemingly infinite web of connections and nodes, and what made it possible was a new definition of ownership. Its fate was sealed during the 1990s when a collective decision was made to maintain the Internet as a ‘free and open’ system. The structure of the Internet is essentially a network of dumb pipes that carries a messy system of TCP/IP routing, rather than a clean, efficient – but costly – manicured system that might have been established and maintained by the telcos of the world. Open and wild vs costly and clean. To make an analogy with software, the same activity takes the form of shared source code vs corporate software development. Linus Torvalds showed that putting the ‘kernel’ of a new operating system into the hands of coders-at-large can elicit a groundswell of participation across the globe.

But what does all of this look like in physical space? It is one thing to send lines of code across digital networks, but an entirely different matter to share… well, matter.

Open source architecture is more than soliciting feedback, and a thriving collaboration is more than inviting many people to join the design process (and it is certainly not, as the today’s most common justification suggests, starting an architecture project as a design competition¹⁴⁹). During the 1960s, it became obvious that so-called ‘participatory design’ is an almost one-way street of endless questionnaires and begrudging stakeholder responses, whereas the magnetic energy of people coming together is a viral, powerful, unconstrained force that accretes as it accelerates, beyond the limits of top-down control. As users join behind a common purpose, collaboration reaches a critical mass of input and output. It is a chemical reaction that happens when a ‘recursive
public” (a term coined by Christopher Kelty to describe a group of people who are concerned with the propagation of that which makes them a group of people) is given the reigns.

The primordial example is cooking: the basic unit of sociability, guided by communal activity over the length of human history. Culinary traditions reflect and shape social interactions in any given community, and are also changed, added to, transformed and passed on as the beginnings of an open source cultural genealogy. Information is shared, rather than matter, and as such it can be easily distributed and modified, taking on a history of its own.

Digital production was dramatically transformed by a new means of effectively sharing ideas, and the same thing is now becoming possible – even advantageous – in physical space. Economist John Maynard Keynes shrewdly observed that, ”It is easier to ship recipes than cakes and biscuits.” The simple statement is compelling, almost blindingly obvious – and yet it is not how the world’s industrial economy works. Alastair Parvin contends that we are moving into a world where the recipes will become the most valuable thing on earth, and yet they simultaneously should be free. “Expect legal battles.”

Design can, in theory, be shared and distributed in the same way as recipes communicate food. In 1974, Enzo Mari – considered “one of the most thoughtful and intellectually provocative designers of the late 20th century,” – presented exactly that: a collection that doesn’t fit categorically into the world of atoms. It took shape as a line of wooden furniture called Autoprogettazione (“self-design” in Italian), a set of chairs, tables, bookshelves, beds, etc. – but they are presented and sold as a list of do-it-yourself instructions. The document allows anyone to build, modify and adapt a cohesive set
of furniture in their home or garage, all without power tools (today, somewhat ironically, a luxurious kit of beautiful pre-cut wood pieces is available from Finnish furniture house Artek).”

Autoprogettazione, like Linux, is still driven by the basic idea of sharing code. The instructions for assembling the furniture are a kind of information – an intangible genetic material for design – to be communicated and distributed. Aside from ‘hack’ aesthetics and a rhetoric of personal agency, there are deeper questions raised by a project like Autoprogettazione: Who, really, is the author of the ‘Enzo Mari chair’ I just built with my own two hands? What if I sell it? What if another company starts producing a kit like Artek’s? Could they be sued? These all point towards a somewhat archaic notion of authorship, ownership and copyright. The latter is defined as the specific legal structure that allows a national government to grant exclusive rights of ownership to the creator of a work – that is, specifically, the right to copy, produce derivatives, perform or display, and most importantly, to financially benefit from it. Under this umbrella, code is now acknowledged and appropriated. Copyright began as a response to the printing press, and is now standard authorial protection for almost everything from literature, music, images and intellectual property to art, architecture and consumer products.

In 1983, with the distribution of his reactionary GNU Manifesto (named as a recursive acronym for GNU’s Not Unix!), Richard Stallman proposed an idea he called ‘copyleft’: a system in which copyright law would be massaged such that any given work could be free and open for modification. Furthermore, every subsequent iteration – whether modified, augmented or elaborated – would be free as well. In the manifesto, Stallman wrote that “GNU is not in the public domain. Everyone will be permitted to modify and redistribute GNU, but no distributor will be allowed to restrict its
further redistribution. That is to say, proprietary modifications will not be allowed. I want to make sure that all versions of GNU remain free." The system was predicated on an entirely new conception of rights and ownership: authorship evolved.

Two decades later, at the turn of the millennium, the same question of proprietary authorship continued to plague academic and activist Lawrence Lessing. He found copyleft to be just as strict – albeit the polar opposite – as copyright, and sought to articulate a flexible middle ground. Through his scholarly and civic work on rights, he conceived of a more systematic form of open protection, what he called a creative commons. Lessing’s non-profit organization, founded in 2001, published a series of licenses that are free for public use; documents that enable creators to choose which rights they reserve as their own and which they waive for the benefit of the public. ‘The author’ (whatever that now means) is no longer the sole, hermetic, inviolable proprietor of his work, but rather the originary branch of a tree that sprouts twigs and buds with each additional collaborator. Rather than the black and white schism between copyright and copyleft, Creative Commons becomes a tailor-made set of rights. A Creative Commons license facilitates the delicate balance between controlled creative development and chaotic participation.

As such systems have propagated and enabled an increasing number of projects, they have proven that the benefits of moderated sharing go beyond human altruism or aesthetic ends. The possibility of an astronomical degree of public visibility that a Creative Commons license promises – while still crediting the intellectual and aesthetic contributions of the author and subsequent modifiers – has completely changed both amateur and professional creativity. In her work the Future of Creative Commons, Cathy Casserly, Creative Commons’ CEO, wrote,
“People used to think of reuse as stealing; today, not letting others use your work can mean irrelevance.”

Estimates point towards over 500 million works currently licensed through Creative Commons, particularly weighted towards media platforms like YouTube, Wikimedia Commons and Flickr. Because they mitigate the constraints of copyright law (particularly for the average person making a YouTube video), a Creative Commons license is the tool that enables a creator to take advantage of the full collaborative potential of the network around him. Creative Commons allows anyone to reuse, augment and adapt anything from a logo to a piece of furniture, while still citing the original designer. Flexibility, evolution and adaptation are possible, but the powerful engine of human motivation remains intact: acknowledgement of authorship. The chair in your living room might have been nailed together by your own hand – even modified – but still bears the signature of the original creator, Enzo Mari, Autoprogettazione, 1974.

Creative Commons is a fulfillment of the whimsical social-design-theory that Mari had posited decades earlier – or rather, it is a legalistic tool for implementing Mari’s ideas for shared production and design. Now that such a statutory measure of protection is in place, the other side of the coin is physical and spatial: an open-ended platform, or freeing agent, for the substantive production of shared technology. It is only logical that the first and most successful instance of physical open sourcing happened at the intersection of the digital and material world. It is cheap, adaptable and ubiquitous, but most importantly, makes sharing and building physical ideas as easy as sharing and executing lines of code: the Arduino.
An Arduino is a tiny piece of hardware, a single board adorned with various circuits surrounding an 8 or 32-bit microcontroller. Its digital shadow is a simple software, called the Integrated Development Environment, that enables users to write lines of code to control the Arduino’s various functions. Code is shared openly via Creative Commons, and can be used and adapted by anyone. The system is essentially a bridge between digital and physical, turning script into action. Internet theorist Clay Shirky posted in an online forum, “An increasing number of physical products are becoming so data-centric that the physical aspects are simply executonal steps at the end of a chain of digital manipulation.” That is, there is a shrinking distinction between the physical and the digital world, and Creative Commons is the enabler of fluid sharing within and across them.

The tiny, open-ended microprocessor is igniting a sea change in production and design mentality, a shift toward so-called ‘physical computing.’ Arduinos have become the base unit of personal fabrication (or hacking, to use the popular terminology), allowing any gadget to sense its environment, get online, control other electronic devices, or communicate with one another. Objects are smart, but most importantly, ideas are shared. Everything from detailed plans for building your own Arduino to lines of code for animating it to do almost anything are free and open for use and adaptation.

This is a tectonic shift in collaborative production mentality, and it is not confined to the Arduino platform. The same kinds of projects are cropping up around the world and across disciplines – a broader manifestation of the same energy that has always driven humans to cook together, share food and develop culinary traditions. Sharing and collaborating are a simple human impulse, and now – using the connective platform of the Internet and
production tools like Fab Labs and Arduinos – they can. As Keynes noted, there is more value in the *recipe* than the *cake*.

The paradigm shift that has defined today’s creative landscape is twofold. Immediate ubiquitous connectivity and the platforms that are built upon it allow for information to be shared in an unprecedented way. What was formerly a linear (dead end) distribution from creator to consumer has now become an accelerated feedback loop with plural creative input. At the same time, new technologies have made it easier than ever before to execute and instantiate. The jump from information to physicality has almost disappeared, and as a result, code itself becomes more important than implementation. Fab Labs and Arduinos have proven that the recipe is more valuable than the cake. The design process is driven less by craft and physicality than by communicable information. Beyond Fab Labs and Arduinos, a plethora of projects and platforms are emerging to bridge the gap between digital to physical.

A project called OScar began as a manifesto and an online platform, with the goal of designing a cheap, easy to produce car by an entirely decentralized design process.¹⁵⁷ The project was soon followed by OSGV (Open Source Green Vehicle), which sought to implement an open design process to address problems of sustainable mobility. Designed by a core team of developers and a constellation of contributors, a 7-passenger SUV was collaboratively engineered and produced by a start-up company.¹⁵⁸ Far outside the automotive world, a project called Free Beer (or Vores Øl, in Danish) translates the principles of free software into tens of thousands of liters of brew: anyone can download its recipe, tweak it, and sell their own distinctive beer. Today the Free Beer mark is produced by two full-scale breweries in Copenhagen and Zurich.¹⁵⁹ The Neuros Open Source Device is a non-proprietary
media center (based on Linux, of course!) that can record and store content from virtually any source in a standard format. And of course, there is the much-publicized, mildly unsettling, but primarily witty RepRap – a 3D printer that can only be constructed with parts printed by another RepRap.

There is no single trajectory for an open source project, nor is the outcome really ever anticipated. A post on the online RepRap forum states that “Open project evolution is somewhat Darwinian. Many fall by the wayside and are abandoned, some fork into newer and better projects leaving the parent behind, some just keep on going successfully.” The single commonality between all of them is that the entire process is driven by a collective energy – the motive force of open source evolution, to continue the metaphor.

Paola Antonelli, Architecture and Design curator at MoMA, termed it a ‘new hacker culture,’ sparked by a perfect storm of interrelated projects: things like MAKE Magazine (and its Maker Faires), Processing (the universal programming language), the Arduino (what Antonelli called “the magical board that sits at the very foundation of the contemporary physical open-source universe”), and the Makerbot (low-cost 3D printer).

“It is, of course, brought to life by the act of tinkering productively, experimenting, testing, re-testing and adjusting, and all the while enjoying it with many like-minded spirits and engaging with the world in an open, constructive collaboration with colleagues and other specialists. In other words, in open-source mode,” Antonelli concluded.

Such a tectonic shift in the process of design and fabrication is even causing tremors in the realm of traditional production. Companies have begun to realize the creative and constructive potential at their fingertips, and are struggling to implement a hybridized top-
down and bottom-up model. They have identified the incredible energy of hackers and tinkerers around the globe as a renewable resource, ripe for harvesting (or, to cast it in a more cynical light: why should companies finance an R&D department when they can crowd-source for free, with the same net result?). Some companies are embracing an ethos of ‘release early, release often’ – usually buggy, unfinished, beta versions of products, but even those half-baked projects are eagerly grabbed and modified by early adopters. Product development becomes a collaboration between consumers and corporations in a process of mutual tinkering, feedback and fabrication.

It seems like the last discipline to stir is architecture. The Arduino actively grants a voice to anyone interested in speaking through technology, and people around the world are coming together to co-create in an ever-expanding open source hacker ecosystem. The idea of collapsing the traditional distinction between designer and user seems to have its ultimate fulfillment in open source architecture. Why not hack your house? Where is the open source mall? How can you tinker with office buildings or supermarkets? These spaces shape our every day lives… how would that change if we took an active role in shaping them?

In 1964 Cedric Price stated: “I consider it unlikely that architecture and planning will match the contribution Hush Puppies have made to society today, let alone approach that of the transistor or loop, until a total reappraisal of its particular expertise is self-imposed, or inflicted from outside. Designers and architects would be better employed in devising new languages of comparison from computers, than in using them to confirm the obvious.”

Cedric Price’s inflammatory statement echoes today as an increasingly urgent call-to-arms for architects and designers, as the
cybernetics he only imagined become an implementable reality. The “total reappraisal of [architecture’s] particular expertise” could be an open source mentality, and the “new languages” could look a lot like Creative Commons. Now that these systems exist, voices are beginning to echo from the peripheries of architecture to answer Price.

In 2006, Cameron Sinclair proposed an Open Architecture Network (openarchitecturenetwork.org) – an online, open source platform for designers to contribute to and implement change in the built environment, specifically for the developing world. In his speech for the acceptance of the 2006 TED Prize, Sinclair described his experience of founding the organization: “What it showed me is that there’s a grassroots movement going on of socially responsible designers who really believe that this world has got a lot smaller, and that we have the opportunity – not the responsibility, but the opportunity – to really get involved in making change.” Most importantly, Sinclair describes it as ‘a grassroots movement’: the project is driven by his discovery (or provocation) of an energetic community of ‘socially responsible designers’ and he is seeking a means of mobilizing that public. Specifically, the constituents of the movement will be empowered by a universal platform that allows anyone to contribute – whether they are architects or citizens – and it will organize those contributions in the most effective way possible. Sinclair’s TED Wish, the OAN, incorporates and enables:

- Sharing ideas, designs, and plans
- Viewing and reviewing designs posted by others
- Collaborating with each other, people in other professions and community leaders to address specific design challenges
- Managing design projects from concept to implementation
- Communicating easily amongst team members
• Protecting their intellectual property rights using the Creative Commons "some rights reserved" licensing system and be shielded from unwarranted liability

• Building a more sustainable future

The responsibilities of architectural construction, design, maintenance, etc. are invested in many different stakeholders, but seamlessly integrated into one system. The Open Architecture Network includes a measure of intellectual property protection, incentivizing users – specifically, trained architects and designers – to participate in a rigorous way. Yet, because the platform has embedded design and view/review functionality, the end user is also empowered to design, or at least to guide design decisions. “Far from replacing the traditional architect, the goal of the [Open Architecture Network] is to allow designers to work together in a whole new way, a way that enables 5 billion potential clients [the poorest 99 percent] to access their skills and expertise. The network has a simple mission: to generate not one idea but the hundreds of thousands of design ideas needed to improve living conditions for all.”

The Open Architecture Network becomes a free marketplace for design, with a very real allure to both user groups: for trained architects, of having a design physically constructed and improving living conditions, and for those in need, of receiving an effective and locally optimized building (or rather, an architectural intervention of some type).

Although the Open Architecture Network is still being realized, Sinclair’s wish (in broad strokes) has come true – and each building only takes 24 hours to construct. Wikihouse is an online, open source platform of user-generated designs that anyone can download, ‘print’ with plywood on a CNC mill, and snap together like IKEA furniture or a life-size puzzle (it even comes with a convenient plywood hammer). In the words of founder Alastair Parvin: “Ultimately, WikiHouse is not about a
single construction type, but an open, accessible, adaptable system. It almost becomes a sort of coding language for physical space.”

The plans for each Wikihouse are generated with SketchUp – a free, intuitive 3D modeling software – and are available through Creative Commons at no cost. The first prototype house went up in less than 24 hours, including cutting and assembly, all with a staggeringly low price tag (as houses go). But the specifics of cost and time are somewhat irrelevant, at this point (like any technology, it will continue to get cheaper and quicker): the importance is how a system like this empowers design. "The driving question beneath something like WikiHouse is whether technology can meaningfully lower the threshold for design and fabrication, and thus democratize making in the same way that the home printer democratized the printing press, or YouTube democratized broadcasting.”

Despite Parvin’s efforts and the ground that Wikihouse has covered, quick building printers still have a distance to come before the idea is universally implemented. In the interim, each link in the design and production chain can nonetheless be infused with open sourcing – from funding to production to assembly.

The collective momentum, then, isn’t restricted to design. Although funding is traditionally the purview of philanthropists or wealthy corporations, it has now become democratized by crowdfunding platforms like Kickstarter. With a modicum of video-making knowledge (which, thanks to YouTube and Creative Commons, is nearly universal) anyone can launch a passionate message to the Internet-at-large and wait for funds to echo back. Through Sitra, a Finnish innovation fund, Dan Hill proposed a rough and ready physical version of Kickstarter called Brickstarter. The platform is aimed more towards community participation and Internet-enabled neo-barn-raising. That is,
responses to a Brickstarter campaign would less likely be cash than an eager, boot-shod twenty-something with a shovel. Goteo is a platform developed and launched in Spain that effectively collapses Kickstarter and Brickstarter, enabling distributed collaboration by allowing designers to solicit specific kinds of contribution – from services, to funding to microtasks and anything in between.\^174 Estate Guru\textsuperscript{175} is a somewhat more mature platform with similar aims – aggregating funds to facilitate architectural production. The sum total is that real, tangible projects – which would never before have gained enough traction – could take off thanks to Internet-megaphone platforms. A functional Brickstarter platform was never launched, and many other initiatives of its ilk will suffer the high mortality rate of startups. The importance is not in the name or the specific platform, but the broader shifts: Kickstarter, Brickstarter, Goteo and Estate Guru – among a variety of others – show momentum in the same direction.

Paola Antonelli was right: every ingredient of a ‘new hacker culture’ is here. Networks for sharing information and ideas (the Internet and its communities); protection for authors and a system of easily managing rights (Creative Commons); tools for implementing design in physical space (Arduinos, 3D printers, CNC mills); and the means – financial or manpower – to make it happen (Kickstarter and its family). These constitute the engine that will drive the accelerating force of collective production.

\textit{You are a designer. \textit{Making} is democratized.}
Productive, collaborative, shared design is happening around the world, and it is only accelerating. Yet as it becomes increasingly mainstream for software and consumer goods, the open source mentality has been muscled out of architecture by traditional practice and remains in the murky periphery of the discipline’s spotlight. A reductive categorization is that architecture still operates under the authorship model of Copyright, when design, media and culture are moving towards Copyleft and Creative Commons. Almost all disciplines are rapidly expanding in scope while architecture progresses tentatively.

It would be difficult to find a major technology or science magazine that hasn’t run a cover story on DIY or fabrication or the “Arduino revolution,” but participatory architecture is far from the covers of Architectural Digest, Dwell, Abitare, or Wallpaper Magazine. It is marginalized by a world still clinging to the names and signatures of its genius creators. Media outlets find it hard to talk about a project in terms of not one, but many authors. When was the last time you saw a Dezeen post on the generic?176

Media loves the cult of the celebrity architect – in 2011, Abitare ran a full issue titled Being Jean Nouvel, with the tagline: “Jean Nouvel unveils to Abitare his private and public life. Who is he? Which are his friends? How does he use his time? What does he do? With whom does he work?”177 … only the most recent in a series of profiles that includes Norman Foster, Renzo Piano and Zaha Hadid. In Japan, Tadao Ando’s media-beguiling pedigree as a truck driver-turned-boxer-turned-architect is typified by the popular anecdote in which the enraged perfectionistic architect strikes down a construction worker with a one-hit knockout. The same idea has inspired filmmakers as well; a 2011 FastCo Design article178 reviewed a documentary about the Eameses, praising the filmmaker’s “willingness to probe the Eameses’ (especially
Charles’s) less-than-saintly habits, giving the film an unexpected edge.” Not to be outdone, Architectural Record ran a review of *The Competition*, titled “Starchitects Face Off in New Film: The Competition,” enthusiastically hailed as a “documentary where architects stop being polite and start getting real” – it all sounds uncannily like reality television. This is what it looks like when the 21st century media machine lionizes the Promethean architect.

The media is fixing its camera in the wrong direction. It is focused on the individual, but missing the broader implications of a shift in the discipline. Comparing the sheer productivity and number of people designing (not to be confused with ‘designers’) might tell a different story than what is printed in magazines. Not only that – a more important question is: *does open sourcing even need mainstream media?* How relevant is a cover story when WikiHouse is poised “to make it possible for almost anyone, regardless of their formal skills, to freely download and build structures which are affordable and suited to their needs?”

“The factory of the future may look more like weavers’ cottages than Ford’s assembly line,” … an uncharacteristically bold statement for the pages of The Economist. The implication is that democratization of production will revisit the *timeless way of building*, the forms of production that yielded anonymous or vernacular architecture. Most notably, this will have a dramatic impact on the economics of cities and the production of built environment. Parvin speculated that in the future we may look back on the monolithic, top-down, financially-capitalized, one-size-fits-all models of architectural production as an awkward, adolescent blip in mankind’s industrial development. The idea of bottom-up, locally-adapted, copied typologies, produced by citizens using their social capital as well as their financial capital, is *the opposite* of new. In many ways it is bringing technology to pre-
industrial 'barn-raising' approaches. Open source architecture is presented as an innovation, but it is really just the vernacular with an Internet connection.

The challenge is looming, goals are clear and technologies for achieving them exist. The task, then, is to reflect on the potential implications that 'future vernacular' will have on economic development, social justice, resource scarcity, labor economies, planning systems, and the role of professionals. The discipline cannot remain hermetically sealed forever – there is a critical mass of people, ready and willing to work in a bottom-up way. A tipping point is approaching: architecture as information and empowerment through fabrication. The boundaries of the discipline will be exploded outward by sharing marketplaces, building-scale Thingiverses, “remixes” of iconic buildings, fab-labs for homes, open-source plans and 3D models, or the architectural Arduino. And when it does, will you hack your house?

146 Gershenfeld, Neil. TED lecture, “Unleash Your Creativity in a Fab Lab.” February 2006
147 ibid
148 ibid


Wikihouse website. Wikihouse.cc


Hill, Dan; Boyer, Bryan. Brickstarter. Brickstarter.org

Baraona-Pohl, Ethel. Personal Communication as Adjunct Editor. December 2013.


Wikihouse website. Wikihouse.cc


Building Harmonies:  
Toward a Choral Architect(s)

In reality, architecture has become too important to be left to architects.

* * *

During the summer of 2006, Annie Choi – a recent graduate of Columbia’s School of Arts writing program – hunched over her laptop, typing quickly despite the noise of the New York City streets outside and the heat trapped in her apartment. Perhaps because she was relegated to a cramped 187 ft² studio without air conditioning and “four pieces of furniture, total,”¹⁸³ she harbored festering resentment. On her screen was an open letter to architects, its first words: “Dear Architects, I am sick of your shit.”¹⁸⁴
Through her network of architect friends, Choi had come to know the editors of Pidgin Magazine – a recently founded annual publication based at the Princeton School of Architecture. To date, the magazine was quite rigorous: a self-proclaimed ‘dispatch’ from within the school to communicate architectural work and ideas to the outside world, taking shape annually as 256 (very well-designed) pages of theory, renderings, project descriptions (what amounted to “abstract blah-blah,” according to Choi). Very high-level, of course, so the editors reasoned that the second issue might need a breath of fresh air. It would be great to invite a non-architect to contribute, and better yet, why not their friend – an up-and-coming young writer based in New York?

Choi had recently published her first book, *Happy Birthday or Whatever*, finding her wry, irreverent voice through “humorous essays about family and, as I like to call it, ‘stupid shit I love to talk about.”¹⁸⁵ Her work had nothing to do with architecture, but sketched emotional, unpolished accounts of personal experience. The open letter on her screen emerged from what she called her “complicated relationship to architecture, which is to say that I don’t really give two poops to the wind about it, but all my friends are architects and the only thing architects talk about is architecture.” She was, by that point, fully qualified to comment on the profession.

Whether or not the editors expected it, Choi delivered a scathing deadpan criticism. The open letter unapologetically made fun of the culture of architecture… “but you know, in a loving way.”

After dense pages of Pidgin’s cutting-edge academic discourse on architecture, the letter from Choi was a jab in the ribs. She casually announced to the architecture community that they were irrelevant: architects “all design glass dildos that I will never work..."
or live in and serve only to obstruct my view of New Jersey… I do not care about architecture. It is true. This is what I do care about: burritos; hedgehog; coffee. As you can see, architecture is not on the list. I believe that architecture falls somewhere between toenail fungus and invasive colonoscopy in the list of things that interest me.\textsuperscript{186} Behind the indelicate language, Choi was actually making an incisive criticism: architects, look around you. Don’t take yourselves so seriously, and spend a moment to think about the people you are designing for.

Responses to the letter were violent. Choi had hit a nerve. Hate mail poured in from architects around the world, demanding respect or challenging her to enroll in a graduate program on architectural theory before proffering an opinion. But by the same token, the letter gained considerable momentum and support. Architects who felt trapped in the system and culture of architecture identified with its refreshing perspective. The letter put to words – in the frank, readable language that architects cannot seem to get onto a page – the extent to which architecture had spiraled into itself, exposing the tremendous effort of the Promethean architect as nothing but self-congratulatory irrelevance.

Aside from its institutional pertinence, Choi offered her own – very characteristic – explanation for her letter’s success: “I think maybe architects liked the letter because it’s so abusive and architects just like pain? Or they like any attention, even if it’s bad?”

* * *
However crass or sarcastic, Annie Choi’s open letter made an incisive critique of the profession as a whole, unapologetically calling out the navel-gazing discourse and irrelevance to which it has dissolved. In the letter she writes, “I have a friend who is a doctor. He gives me drugs. I enjoy them. I have a friend who is a lawyer. He helped me sue my landlord. My architect friends have given me nothing. No drugs, no medical advice.”

Choi rattles off a laundry list of grievances, from cramped apartments to sprawling malls, amounting to a portrait of the day-to-day relevance for the vast majority of humanity’s daily interactions with buildings. Architects do nothing to address these very real, immediate concerns, despite that those concerns are situated squarely in the purview of the architect. Academically and professionally, architects are disconnected.

There is a sharp asymmetry at play: people know what they need and want, yet architecture spins into navel gazing and drifts farther and farther from the possibility of substantive contribution to the communities it is meant to serve. In his 1967 book _Soft Architecture Machines_, Nicholas Negroponte wrote that there is “a general feeling that architecture, particularly housing, has been inadequate and unresponsive to the needs and desires of its users… the design of housing is in the wrong hands, that is, in the hands of an outside ‘professional’ rather than that of the resident.” No one is more familiar with the user’s needs than the users themselves, yet they are excluded from the process. The same substantive critique existed in pre-modern architecture – the object of Gustave Flaubert’s rant in the _Dictionary of Accepted Ideas_ – published at the turn of the 20th century: "Architects all idiots; they always forget to put in the stairs."

The objective of user-focused design has long motivated architects. The goal of Modernism and the gesamtkunstwerk approach was to
resolve all of the deficiencies, inefficiencies and inadequacies of architecture in one swift stroke. Considering the totality of human inhabitation as the object of design, the Promethean architect sought to reform modern man, from spoon to city, from city to society. That gleaming white purity of intention has, over the past century, been at best revealed as a chimera, and at worst forcefully shattered by the realities of habitation and society. Yet the profession clings to its scraps of messianic idealism, at once aloof and impotent.

The blame, however, is hard to place. In what amounts to a universal tangle of finger-pointing, specific issues are shunted between participants in the design / construction / inhabitation process until human relevance is lost in the mix. Almost all governments, for example, promote the construction of more energy-efficient buildings, but effectively pass the baton to development organizations that (logically) see higher energy performance purely as a cost. The only person with a direct economic interest in designing for better energy performance is the person who will pay the energy bills… and the only way that person can exercise control is to shut off the heater and shiver through winter. The general principle applies very tangibly to nearly every aspect of design.

An analogy is a child playing at the beach – completely absorbed in crafting the most magnificent sand castle that the shoreline has ever known, he works with his back to the sea… where, unbeknownst to him, a terrific wave looms, poised to crash. As Bucky Fuller ominously proclaimed in 1969, “Whether it is to be Utopia or Oblivion will be a touch-and-go relay race right up to the final moment… Humanity is in a ‘final exam’ as to whether or not it qualifies for continuance in Universe.” It is, perhaps, dramatic to swell architectural practice to the scale of the Universe
as a whole, but the same urgency certainly projects onto the rising tensions in human habitation. Architecture is, by necessity, at the brink of another revolution.

With the lack of user participation echoing throughout the history of modern architecture – and as users drift even farther from the design process today – new open-source models for a collaborative approach may have dramatic implications. From software to Fab Labs, open sourcing has emerged as a powerful new mode for engagement. The pressing question is how to reorient architectural practice toward people, and the answer will be to put architecture into the hands of those people themselves. Has the moment for a new, relational and less hierarchical form of production finally arrived?\(^{192}\)

This amounts to a galvanic call for action. Ethel Baraona-Pohl maintains that “the time has come to transform dissatisfaction into serious proposals to start taking back the city for the citizens, to remove the distinction of public and private in the urban environment, to go from DIY (do it yourself) to DIWO (do it with others).”\(^{193}\) No doubt an extreme position, but there may yet be a future of architecture designed by humanity, for humanity.

In the course of this revolution, as control returns to the crowd, must the architect be guillotined? Does this toll the death of his promethean figure? He can only survive through adaptation – and if he is successful, what will be his role?

This central question – a redefinition of the architect – was explored from many angles by architects and thinkers from the 1960s. In a prescient answer, Nicholas Negroponte predicted the evolution of the designer into a ‘middle man’: a creator of open frameworks rather than deterministic forms. The process of architecture “would not be a case of reckless autocracy; rather, it
would be a pervasive and evasive set of restrictions,” suggesting a fundamental transformation of architectural deliverables. Rather than providing a finite and tangible design, the architect would determine a set of parameters that direct a flourishing body of ideas, a nearly infinite spectrum of potential architecture. Architects design the question, not the response. Citing Yona Friedman, Negroponte wrote, “The paternalistic character of the traditional design processes will disappear. The enormous variety of emotional (intuitive) solutions which can be invented by a large number of future users might give an incredible richness to this new ‘redesigned’ design process.”

Concerned with, in the words of Hans Ulrich Obrist, “flexibility, responsiveness, transience, relativity, joy,” Cedric Price worked toward a similar reconfiguration of the architect’s role, forging an idea of the architect as programmer. In projects such as Pottery Thinkbelt, the Magnet Project, and The Generator, the architect provided a set of algorithms, provocations and interactions. “In Price’s view, the architect should not be content with being a mere designer of hardware, but should demand an even broader responsibility for creating activity programs and determine how they could be integrated.” Obrist focuses on Price’s key architectural contribution as the activation of space, rather than its creation. “The idea is not to occupy space, but to trigger relations and social spaces, stimulate new patterns and situations of urban movement in the city.” The architect offered event rather than form.

Beginning in the early 20th century, the emergent discipline of cybernetics sought to explore network systems, focusing on the communication and connections between interdependent nodes – and it offered the language in which Price would define the architect-as-programmer, in a fertile collaboration with pioneering
cybernetician Gordon Pask. In *The Architectural Relevance of Cybernetics* (1969), Pask was one of the first to apply the conceptual framework of cybernetics to architecture, largely through discourse and collaboration with Price. “We are concerned with brain-like artifacts,” wrote Pask, “with evolution, growth and development; with the process of thinking and getting to know about the world. Wearing the hat of applied science, we aim to create… the instruments of a new industrial revolution – control mechanisms that lay their own plans.” When applied to architecture, it became less about designed, artistic, object-buildings and moved toward architectural scripts for adaptive ecologies that evolve through a form of dialogue with inhabitants.

Price was almost discarding architectural precedent, in favor of *architecture as event*. Conversely, John Habraken suggested that the redesigned design process would be discovered only through close scrutiny of the characteristics and tendencies embedded in the existing fabric of architecture – that is, considering the built environment as an autonomous entity. Throughout the history of architecture, as Habraken points out, building design has evolved on the timescale of generations. “We should recognize that the built environment is an autonomous entity that has its own ways and the architect should study that and explain how and why he can participate in that largely autonomous process.” In the traditional evolution of vernacular architecture, a person may design her house to be similar to the neighbors’, but with slight modifications and improvements. After a project is built, it is evaluated by the community, even unconsciously, and subsequent projects will modify and innovate. So architecture propagates and evolves, based on typologies, shared information and subtle experimentation – from Native American dwellings to Gothic cathedrals.
As Habraken articulated in *The Structure of the Ordinary*, willful architectural intervention should be predicated on diagnosis, just as a medical doctor studies the human body before he administers treatment. Based on a foundation of examining and analyzing the existing built environment, an architect can ultimately create frameworks that cultivate user-generated design, leading to what Habraken calls *three-dimensional urban design*. A project is not a grand act of creation in and of itself, but a single link in a much longer evolutionary chain. The role of the architect, in Habraken’s estimation, is closer to that of a gardener. He learns horticulture, surveys the land, creates planter beds, and nurtures the plans that inhabit them. He is in partnership with inhabitants, rather than simply delivering a product. He leaves the most intimate material element of the built environment (house, work unit, etc) to be the sole purview of users themselves. In this way, the living cells of architecture correspond directly to the individual in what Habraken calls a ‘natural relation.’

This is not traditional on-paper participation at the level of urban planning, and users are not embroiled in the politics of the overarching project as a whole. The key point is to make a “distinction between group, consensus-based collaboration (which is almost impossible) vs a more plural, permissive, shared-protocol based approach, in which individuals are more or less autonomous, but operate within basic common rules, and copy from each other (which is almost inevitable)” It is instead a delicate process of independent but interconnected production, with the architect serving as gardener, catalyzing the collective-individual scale. People can inhabit naturally, based on their preferences, yet exist harmoniously in the shared space of a single building. The
architecture that people come into contact with is "a living cell where the nominal social unit interacts without mediation with the smallest material unit recognizable as a changeable whole." That is, people have agency in their own environment, which, collectively, constitutes the driver of the evolutionary process. "Ultimately, once the living cell is capable of individual action to adapt or renovate, both invention and sustainability can penetrate rapidly in the entire body of an environmental fabric. At that point the network among inventors and designers – including lay people – can fully develop its true potential." The architect’s role is to study that ecology and participate a distributed and self-determining process.

Habraken’s model was prescient of production models that are only just coming into their own. Many of the collaborative experiments that have emerged on the Internet, such as Linux or Wikipedia, utilize a very similar distributed generative mechanism, but with a key difference: the autonomy of the individual contributors is guided, moderated and nurtured by editors who can make decisions from the top down. This editorial role, more than that of a gardener, a middle-man or a programmer, has a broader orchestrating function. He will have qualities of each, but simultaneously take on an entirely new character, in the context of a digital and networked world. It is a plural figure that could be called the Choral Architect.

As it outlines a new kind of designer, the idea of a Choral Architect brings with it a host of related questions. What tools and methods can direct dispersed energy in a way that transforms a crowd into a cohesive, motivated, and productive entity? How can a broad network of people, working together, arrive at a buildable and relevant architectural design? And if that is the goal, how is the Choral Architect different from the principal of a corporate
architecture firm. In light of this plural creative model, what is the specific role of the Choral Architect?

The first and most fundamental responsibility of the Choral Architect is to frame the process – to start and stop collaboration. Just as Torvalds did with Linux, the Choral Architect must generate a 'kernel' that is subsequently distributed, iterated and added to. Without an impetus, the crowd will default to Brownian motion. By the same token, Giuliano da Empoli suggests that one of the most important tasks is actually to end the collaborative production. “A new and better idea might emerge from the network a day, or a week after the project is closed. But he has to do it, otherwise nothing will ever get built… this prerogative is an essential one. It should be included in his job description.”

Da Empoli implies that the Choral Architect is also responsible for steering the project by making often-difficult decisions and defining the rhythm of its development. He has a role as arbiter in the situations when consensus cannot be reached – again, much like the team of editors that guides Linux through a tumult of input. In some cases, the editorial hand needs to be incisive (more similar, perhaps, to that great critical tool that Ernest Hemingway described as his ‘built-in, shock-proof, bullshit detector’). He is also responsible for setting the pace of the entire process, deliberately orchestrating the moments of openness and collaboration vs. closed honing and decision-making. Within these capacities, the Choral Architect might also integrate her own aesthetic or functional ideas, contributing expertise and personality to the specific project.

The output of an architect, then, would not necessarily be buildings or construction documents, but to begin, end, and coordinate the process whereby architectural source code is shared, adapted and executed. The Choral Architect will orchestrate actions and
interactions naturally emerging from a group of peers – and therein is the difference with the principal of a corporate architecture firm – rather than creating objects. In framing the work of a co-design lab at Sitra, Alejandro Aravena wrote, “A good strategic framework will not precisely predict a single solution, but will help the best solution seem self-evident when identified.”

Yet this does not at all mean an abdication of responsibility or even ‘signature’ from a given project, any more than it does for an art curator. Arguably, the curator’s voice is just as prominent as the artists’, but in a more diplomatic role: steering the meaning of an exhibition through proximities, juxtapositions and pairings, rather than speaking through a brush and paint.

If architecture can operationalize a similar design-curation ecosystem, each instance of this networked editorial creative process would be unique. A project would derive from the peculiarities of the particular group and the context it is working in, draw on the tremendous power of the network, and be moderated by the Choral Architect. Because the content of a project is not singularly generated (as in the author model), and because evolution happens within its lifetime, the choral approach yields surprising results. Valuable – and previously voiceless – insights will be aggregated and instrumentalized in the process of design. As the power of the crowd comes to bear on specific problems, the global could in effect mediate with the local, addressing some of the problems inherent in so-called Critical Regionalism – specifically, the irrelevance of a starchitect copying and pasting her characteristic style indiscriminately across regions or the blandness of standardized, anesthetized architectural products. The collaborative online design process brings together voices to create a kind of ‘Network Specifism.’
Contemporary network technologies give rise to robust and productive curation ecologies, just as in open source software. But ultimately that global collaborative energy must be funneled into brick-and-mortar architecture. The role of the Choral Architect is also to maintain and orchestrate that materialization process. As it has always been, the built environment becomes once again an autonomous entity, nudged in one direction or another by the processes of human inhabitation.

We can assert that design becomes plural – referred to here as “the Choral Architect” – yet Habraken’s most incisive question, posed in response to the initial manuscript of Open Source Architecture, has still not been answered. *What is different now than at any time in the past?* After all of the frustrated efforts of involving users in the design process throughout the 20th Century, what will make this substantively different? “That the digital revolution can and will play a role I do not doubt, but… how can a creative network of design and production driven by the digital revolution connect to the reality of built environment’s life and development?”

There are several factors that are poised to ignite new possibilities in architecture. First, information – the ‘code’ or DNA of a building – can be shared instantaneously and a-spatially. The intellectual project of groups like CIAM was to share thoughts, ideas, theory (or code) and collaboratively write a charter – but to do so they had to rent a ship and sail across the Mediterranean. Today collaborative writing happens effortlessly, implicating millions of people every second, around the world through platforms like Wikipedia. Recipes or formulas for spatial phenomena can be considered as the software of architecture, notes Keller Easterling. Just as in Wikipedia, Linux, and open source software, code can be shared, augmented and refined before it is compiled and executed. Choral design ignites the autonomy of
the building process within a single project. The kernel of architecture exists as data, is honed by a distributed sequence of adding and editing, and finally culminates in a physical structure – the execution of code in space.

This kind of sharing can happen effectively now that a building ‘exists’ digitally before it is constructed – promoting a radical change towards openness and distribution in the design process. Traditional and vernacular collaborative processes worked through discrete leaps, as mutation and improvement happened from one execution of the code to the next one – and today that is changing.

In the case of cuisine, for example, there exist basic structures (such as bouillon), and each time a specific soup is cooked, the structure is expanded and made unique, it is shared, eaten and subsequently modified for the next dinner. The result of each experiment is evaluated, and information about the most successful developments is encoded in recipes to be distributed and replicated. Mutation only happens from one dish to the next. Yet today (in architecture), the ability to assess a building before it is built allows collaboration at every stage. To continue with the cooking metaphor, it is as if an individual soup itself were created collaboratively – that is, by many cooks experimenting together in the kitchen.

In this case, the design process would edge closer to the model of science writing, wherein a piece is created by a team of contributors, legitimized through peer review, and distributed for wider application within the field. Work is developed collaboratively (necessarily, given the acceleration of complexity), while the scrutiny of peer review ensures quality and provides a stamp of credibility. In the course of its development from idea to publishing, a single paper experiences a rhythm of opening up to
peer review and revision by the authors. It is a self-regulating, participatory and incentivized system.

This is the mandate of the Choral Architect. To contradict the standard adage – cuisine will benefit from many cooks in the kitchen, integrated by a talented chef. Situated between Le Corbusier’s authoritative, era-defining voice and the Internet’s dispersed collective banter, a designer enmeshed in networked communities will make harmonies. The architect will not be anonymous, but plural and compositional, her authorship will not be erased, but contextualized as it is woven into a relational fabric. She is situated between top-down and bottom-up, channeling the raw energy of the latter through the targeted framework of the former. The responsibility of the Choral Architect is less oriented towards object-building than orchestrating process. She is not a soloist, not a conductor, not an anonymous voice among many. The Choral Architect weaves together the creative and harmonic ensemble.

* * *

This chapter has traced the outline of a new Choral Architect – but, hypocritically, with the singular confidence of an assured diva. If we, the author(s), are sincere about these ideas, we won’t be authors at all, but orchestrators of a vibrant dialogue. The text will grow in unexpected directions and at a faster pace if it takes the form of a wiki more than it will if it remains a monologue. Think of it not as a book, but as a debate, or a joke, or a brainstorming session.
With that, we turn it over to you…

183 Choi, Annie. Personal correspondence with Matthew Claudel. August 27, 2013
185 Choi, Annie. Personal correspondence with Matthew Claudel. August 27, 2013
187 ibid
192 Baraona-Pohl, Ethel. Personal Communication as Adjunct Editor. December 2013.
193 ibid
ibid

ibid


ibid


Easterling, Keller. Personal Communication as Adjunct Editor. December 2013.
Over to you:
Go Ahead, Design!

* * *

During the spring of 2011, Domus Magazine was planning a special issue devoted to the concept of ‘open source design’. The issue would include articles on such topics as “The Esperanto of Objects,” the architecture of Facebook, and a crowd-funded monument to RoboCop. When the editors asked Carlo Ratti to contribute an op-ed, he replied with a question: is it possible to
write collaboratively? Especially given the subject – open sourcing – could the piece itself be open sourced?

Eager to put authorship into many hands, he started a Wikipedia page on May 3rd and sent invitations to an initial group of contributors, including Paola Antonelli, Hans Ulrich Obrist, Alex Haw, Nicholas Negroponte, John Habraken and Mark Shepard. The initial email stated:

“I thought that the editorial itself should be written in an OPEN SOURCE, collaborative way — and I thought that we could do it together! At the moment it is the seven of us (feel free to send suggestions about others who might join our effort!) Just to begin the process, I am enclosing some initial points below. Feel free to start adding/editing/…” (Carlo Ratti, email, 03 May 2011)

The page was quickly opened up to the Internet at large, and thoughts, comments and revisions began pouring in. What started as a few bullet points became an unstructured lump of text and then took shape under headings and sources and references. Yet nothing escapes the assiduous (and abundant) eyes of the Wikipedia community. As it grew, the OSArc page was red-flagged as an ‘opinion piece’ by the editing collective and quickly deleted on May 11th, after only eight days of work.

Undeterred, the article was polished and finalized offline until it was captured in print on May 18, 2011. The fight with Wikipedia editors ended when the piece was published in Domus, the paper copy adding legitimacy to its digital antecedents and progeny. What appears in the magazine is like a screenshot of a live-action film: a single instant, frozen for the sake of convenience, but pointing towards a far more interesting and dynamic whole. OSArc, generated through a new writing process, skips between different
media and a range of scale, ultimately speaking with professional credibility, but without a singular byline.

Perhaps as a result of its distributed authorship, the process wasn’t smooth, sharing wasn’t seamless, and voices still shouted or whispered their own ideas. Comments circulated by email among the initial collaborators range from hilarious — “yo all, love the fact that the wikibods scheduled the article for deletion within minutes of its posting; the iterative question-marks of subsequent edits might accelerate its demise” or “the thing about the Korean sauce is not THAT funny...” — to legitimately critical of the process and broader concept of open sourcing — “I will add my bits and will be respectful of the rest but you might want to take the hatchet and the paintbrush in your hands at some point” and “Cooking is often hailed as an early form of opensource.” Some even simultaneously critical and playful, “i love the response to an open invite being a closed email; perfect!”

And of course, the issue of a headshot. Domus traditionally prints a photo of each op-ed author with his article, yet OSArc posed a problem. The editors had initially approached Carlo Ratti, as it was he who wrote the email to kickstart collaboration, but in the end a simple profile photo didn’t seem right. Instead, the final Domus article was run with a digitally collated portrait of all contributors — a race-and-gender ambiguous face, smiling as if it knows something we don’t about the future of design.

Despite its tensions and mutations and ambiguities, the OSArc document remains live and open through Wikipedia and Creative Commons: the same active community of editors that had previously killed a nascent article now operates as a crowd of authors, continuing the conversation since it went to print in Domus. “Opensource Architecture” is in your hands. The text is
fresh, relevant, and has a tingle of urgency — as the page continues to ferment it will grow and change in response to the new (hopefully networked and sociable) dimensions of architecture.

Despite its legitimization and accretion, the Wikipedia page today bears a standard (and somewhat comical) disclaimer in the heading:

*Warning*

*This article has multiple issues. Please help improve it or discuss these issues on the talk page.*

*This article possibly contains original research (June 2011)*

*This article’s tone or style may not reflect the encyclopedic tone used on Wikipedia. (June 2011)*

The publication of OSArc as an article (that is, the transition from Wikipedia to DOMUS) solicited a renewed tide of feedback, both from the editorial group and the public at large. Building on a swell of energy surrounding the theme of open source architecture, we, the authors, were eager to push ideas further – to expand and explore the historical grounding and future possibility of open source architecture – as a full book. And following the same logic that led to the original wiki, we decided to open the writing process to a plurality of authors.

Yet what manifest as minor hiccups and difficulties in the first writing process for the wiki and the Domus article were correspondingly amplified and compounded in the longer-form book. What follows is the story of the text you read in this book.

The OSArc book began when the original authors – Carlo Ratti, Joseph Grima, and Tamar Shafrir, soon joined by Matthew Claudel
– came together during the late spring of 2013 to expand the Domus article, enrich its ideas, and generate an outline for the full text. During the subsequent months, this initial framework was bolstered with references and fleshed out into the first draft of a manuscript, in the hands of Ratti and Claudel. What was rough and conversational at first was iteratively sharpened through successive reviews and revisions.

With the manuscript to a coarse level of completion, the authors contacted a group of adjunct editors, soliciting feedback and augmentations to the text. Unlike the original Wikipedia page, this was a phased process of aggregating comments and incorporating them offline. Each editor was provided an individual Google Doc keyed to line numbers in the manuscript, in which she could insert specific content, to be digested and implemented by the authors in an organized way. Or, that is how it was envisioned.

In practice, feedback came in a wide variety of forms, from sticky notes (Hans Ulrich Obrist) to formally composed and addressed letters (N. John Habraken) to phone calls (Ricky Burdett). Heterogeneous and characteristic responses could be interpreted as either confusion or engagement.... but invariably the editors freely interpreted the system (and some even rejected the system entirely, offering alternatives – as in Ethel Baraona-Pohl’s emphatic support of “Bookie” as a co-working software).

Responses also came with varying levels of enthusiasm, from Giuliano da Empoli’s final note, “I’m afraid you will probably find my comments a bit ‘old style’ and it is true that I am a little bit less enthusiastic about the wisdom of crowds than you seem to be,” to Ethel Baraona-Pohl’s line-by-line notes and accompanying message stating, “It reinforces the feeling of collective writing when some other person (even not knowing who) wrote the same
thoughts you have, some times even better as you can do it. Fantastique!” Keller Easterling had an entirely different reaction to authorship – an impassable friction with the narrative voice that left her no choice but to formulate feedback as a disengaged letter addressing specific themes. As a preface, Easterling wrote, “I have been a bit uncertain about how to contribute. Wikis that add content into line edits often simply collect examples, amplifications or corrections. As I read the text, I did not find too many places where I had the urge to interrupt the voice... When the voice is strong in the OSArc text, as it often is, it has the sense of a sustained argument with clear authorship. Thoughts that engage it in debate would have to stand aside, clarify their distance from the argument or risk unfairly putting words in the mouth of the authors. I would not want to do that... Like Wikipedia or science writing, [my] arguments would perhaps be footnoted to distance them from the main voice and, more importantly, allow readers to access the additional information. Perhaps the whole thing constitutes a footnote? Or a gesture to a sister discourse? I really was not sure... Wiki as encyclopedia is easier than wiki as manifesto.”

The content of responses was far from cohesive as well – Alastair Parvin noted Wikihouse as a platform for the choral architect, while Alex Haw dismissed it as “not a house – it's a silly, useless, nonfunctional project with no surfaces & the most absurd junctions on the planet.” In short, OSArc has become the ring in a wrestling match of ideas – sparring that could continue, seemingly indefinitely.

That question precisely – editing the flow of ideas and framing a work as complete – is a crucial role of the new choral author, in the eyes of da Empoli. “In my mind,” he wrote in a formal message, “the author has one critical responsibility, which is almost always
overlooked: he is the one that decides when the book is finished. It’s a huge responsibility.” In lieu of a true Wiki, the authors of this project have served as orchestrators of a complex (and convoluted) process, ultimately determining its final manifestation.

Another crucial role – particularly in the case of OSArc – was to find some way of crediting a motley assortment of contributions. In light of the varied responses (ultimately no two were the same) the authors decided on a dynamic crediting model based on word count. Similar to Linux tracking individual contributions or Amazon counting user reviews, OSArc cites input according to volume of content. An initial (joke) email between authors on the subject of crediting read “maybe we don’t even print HUO’s name in the book? just a sticky on the inside cover of every copy - With adjunct editor Hans Ulrich Obrist :-P ”

The most difficult question of crediting, however, was within the author group itself. OSArc began as a collaboration between four, and the contract was signed accordingly: authorship was legally agreed as Carlo Ratti and Joseph Grima, with Matthew Claudel and Tamar Shafrir. Yet over the eight-month writing process, Grima and Shafrir found themselves unable to contribute due to other obligations that arose. To honor the integrity of the open source process, Grima suggested that the authorship be changed to Carlo Ratti and Matthew Claudel with Joseph Grima and Tamar Shafrir cited in the list of adjunct editors.

Traditional publishing structures are not, however, amenable to the vagaries of such an evolving open source process. The very structure of the book project – a contract with established publishing houses that grants exclusive rights – is almost antithetical to the ideas presented. The title page subverts the book. The central idea of authorship catalyzed this inherent tension:
amidst all of the internal disjunction and miscommunication, Andrea Bosco, the patient editor at Einaudi, watched helplessly. The ramifications of altering a signed legal contract were unpalatable, to say the least, and the discussion between authors and editor sought a solution that was both honest and equitable. Ultimately (after several months and dozens of email flurries), the question was resolved with no ill feelings.

In retrospect – with edited, credited and curated manuscript in hand – an unsettling question seems to follow the thirteen names on the cover (many of whom have never met or exchanged more than a few emails). How different would these pages be without the Internet? How many years would it have taken? What would have happened if we all sat in the same room? Could we have boarded a boat (or a cruise ship with well stocked bar, à la CIAM) and disembarked holding the same text?

Similar projects in the past had a heavy overhead for working together – simply coordinating logistics and travel for a dozen contributors was a titanic effort. For that reason, the ten conferences of CIAM (and its ultimate dissolution at Congrès XI) hold an unprecedented place of legend in architectural history, as crowning moments of the Modernist movement and 20th century architecture as a whole. The epitome of CIAM was the meeting held aboard a cruise from Marseilles to Athens, during which the group, spearheaded by Le Corbusier, produced the Charte d’Athènes – a radical and prescriptive urbanist vision. Shortly thereafter, another group, called Team X, emerged from within CIAM and proposed divergent ideas (its birth, in fact, causing the fatal rift in the original group).

Team X had a subtly different approach. Although they did meet in person a handful of times, the group was more diffuse – a
collection of architects and thinkers brought together by common ideas rather than international summits, more prone to releasing parallel but distinct individual pieces than titanic, monolithic manifestos. In its Team X Primer, editor Alison Smithson described the circle as "a small family group of architects who have sought each other out because each has found the help of the others necessary to the development and understanding of their own individual work." The primer itself is a collection of essays, sent in by Team X members and curated by Smithson – in a way, a non-direct approach to outlining the team’s ideas by triangulating between many different voices.

Echoes from Team X resonate with the choral architect – they were a group that collaborated through an analogue process, nonetheless pointing toward the kinds of co-creation that are now possible with the Internet. Connectivity today is fluid, immediate and a-spatial. The writing process of this book hinged on the Internet for both organization and content – the four original authors of OSArc were based on three different continents, and the Adjunct Editors are even more widely spread. The Internet allows asynchronous, around-the-clock conversations between many people, as ideas are thrown into the cloud, nurtured, pared or mutated. Collaboration today has been pushed to radical extremes – spatially extended and temporally collapsed – as discussed in Learning from the Network.

… But does that also cheapen it? Perhaps the symbolic weight of physically coming together, as did CIAM on the cruise ship, lent urgency and gravity (and spectacle?) to a project, somehow galvanizing the ideas of the group. Can the best possible ideas be generated and communicated in a quick email? More importantly, what provides incentive to contribute in a substantive way? And, given active participation, how is that energy directed? Could it
ever be charged with the reactive energy shared by a crowd in real
time?

The process of both coordinating and writing OSArc made clear
the need for orchestration. Although vibrant, the kaleidoscopic
latitude of contributions is not productive without direction. A
crowd defaults to Brownian motion. It is lazy, as Torvalds is keen
to point out, but often without the cunning of the fox (and indeed,
even Linux is oriented by a team of governing fathers, under
Torvalds, the grandfather). This book, specifically, would be
unrealized by the initiative of the crowd – but by the same token, it
would not exist, in its present form, through the efforts of a single
person.

The project of this book, then, amounts to an appeal for merging
the two, and gives a name to the entity who will realize it. *The
choral architect* is situated between top-down and bottom-up: at
the nexus of raw, generative potential and singular vision. OSArc
uncovered a torrent of histories, ideas and opinions, unvoiced
before the catalytic note to contributors, “just a quick email to send
you the attached invitation - it would be great to have you onboard
for this project!” and ultimately knit together by focused authorial
effort. A project like this one must be steered through the
generative process by someone (or team) with the will to see it
succeed. In the case of OSArc, the process was a rhythm of
expansion and contraction – opening up to broader input, then
narrowing to sharpen the ideas. Intentional phasing kept the book
moving and gave it a productive methodology.

The book itself is an experiment, a case study, and an analogy for
the reconfigured creative processes of the future choral architect.
Words are not bricks, and developing a text is profoundly different
from designing architecture, but we believe that the same creative
models will echo through both. Given their basis in tools of a similar ilk (networked, responsive and dynamic), the plural voice of OSArc and the choral architect may, ultimately, be singing the same tune.

* * *

**Open Source Architecture (OSArc)**

Open Source Architecture (OSArc) is an emerging paradigm describing new procedures for the design, construction and operation of buildings, infrastructure and spaces. Drawing from references as diverse as open-source culture, avant-garde architectural theory, science fiction, language theory, and others, it describes an inclusive approach to spatial design, a collaborative use of design software and the transparent operation throughout the course of a building and city's life cycle.

Cooking is often hailed as an early form of open source; vernacular architecture — producing recipes for everyday buildings — is another form of early lo-fi open-source culture, openly sharing and optimising technologies for building. A contemporary form of open-source vernacular is the Open Architecture Network launched by Architecture for Humanity, which replaces traditional copyright restrictions with Creative Commons licensing and allows open access to blueprints. Wider OSArc relies on a digital commons and the shared spaces of the World Wide Web to enable instantaneous collaboration beyond more established models of competition and profit. Traditional architectural tools like drawings and plans are supplemented and increasingly replaced by
interactive software applications using relational data and parametric connectivity.

OSArc is not only involved with production; reception to a given project — critical, public, client, peer-related — can often form part of the project itself, creating a feedback loop that can ground — or unmoor — a project's intention and ultimately becomes part of it, with both positive and negative consequences. OSArc supersedes architectures of static geometrical form with the introduction of dynamic and participatory processes, networks, and systems. Its proponents see it as distinguished by code over mass, relationships over compositions, networks over structures, adaptation over stasis. Its purpose is to transform architecture from a top-down immutable delivery mechanism into a transparent, inclusive and bottom-up ecological system — even if it still includes top-down mechanisms.

OSArc relies upon amateurs as much as experienced professionals — the genius of the mass as much as that of the individual — eroding the binary distinction between author and audience. Like social software, it recognises the core role of multiple users at every stage of the process — whether as clients or communities, designers or occupants; at its best, it harnesses powerful network effects to scale systems effectively. It is typically democratic, enshrining principles of open access and participation, though political variations may range from stealth authoritarianism to communitarian consensualism.

Open Source Architecture revolutionises every step of the traditional building process, from brief-building to demolition, programming to adaptive reuse, including the following:

*Funding*
New economic models, exemplified by incremental microdonations and crowd-funding strategies like Sponsume and Kickstarter, offer new modes of project initiation and development, destabilising the traditionally feudal hierarchy of client/architect/occupant. Financing of private projects increasingly moves to the public domain, offering mass rather than singular ownership, whereas funding of public projects can be derived from more flexible, responsive frameworks than simple levies or taxation. OSArc has particular appeal for builders outside the mainstream economy, such as squatters, refugees and the military.

**Engagement**

Traditional developments deploy engagement programmes in which the community is consulted on incoming developments, with blunt tools such as focus groups, which often result in lack of representation and input, or at worst can result in NIMBYism. With crowd-funded models, forms of engagement are built into the process, enabling a kind of emergent urbanism in which use of space is optimised on terms set by its users. This reclamation of people's power can be seen as a soft, spatial version of Hacktivism. OSArc can suffer some of the organisational drawbacks of open-source software, such as project bifurcation or abandonment, clique behaviour and incompatibility with existing buildings.

**Standards**

Standards of collaboration are vital to OSArc's smooth operation and the facilitation of collaboration. The establishment of common, open, modular standards (such as the grid proposed by the OpenStructures project) addresses the problem of hardware compatibility and the interface between components, allowing collaborative efforts across networks in which everyone designs for
everyone. Universal standards also encourage the growth of networks of non-monetary exchange (knowledge, parts, components, ideas) and remote collaboration.

**Design**

Mass customisation replaces standardisation as algorithms enable the generation of related but differentiated species of design objects. Parametric design tools like Grasshopper, Generative Components, Revit and Digital Project enable new user groups to interact with, navigate and modify the virtual designs, and to test and experience arrays of options at unprecedented low cost — recognising laypeople as design decision-making agents rather than just consumers. Opensource codes and scripts enable design communities to share and compare information and collectively optimise production through modular components, accelerating the historical accumulation of shared knowledge. BIM (Building Information Modelling) and related collaboration tools and practices enable cross-disciplinary co-location of design information and integration of a range of platforms and timescales. Rapid prototyping and other 3D printing technologies enable instant production of physical artefacts, both representational and functional, even on an architectural scale, to an ever-wider audience.

**Construction**

The burgeoning Open Source Hardware movement enables sharing of and collaboration on the hardware involved in designing kinetic or smart environments that tightly integrate software, hardware and mechanisms. Sensor data brings live inputs to inert material and enables spaces to become protoorganic in operation; design becomes an ongoing, evolutionary process, as opposed to the one-off, disjointed fire-and-forget methodology of traditional
architecture. Operating systems emerge to manage the design, construction and occupancy phases, created as open platforms that foster and nourish a rich ecosystem of "apps". Various practices jostle to become the Linux, Facebook or iTunes of architectural software, engaging in "platform plays" on different scales rather than delivery of plans and sections. Embedded sensing and computing increasingly mesh all materials within the larger "Internet of things", evolving ever closer towards Bruce Sterling's vision of a world of spimes. Materials communicate their position and state during fabrication and construction, aiding positioning, fixing and verification, and continue to communicate with distributed databases for the extent of their lifetime.

**Occupancy**

OSArc enables inhabitants to control and shape their personal environment — "to Inhabit is to Design", as John Habraken put it. Fully sentient networked spaces constantly communicate their various properties, states and attributes — often through decentralised and devolved systems. System feedback is supplied by a wide range of users and occupants, often either by miniature electronic devices or mobile phones — crowd-sourcing (like crowd-funding) large volumes of small data feeds to provide accurate and expansive real-time information. Personalisation replaces standardisation as spaces "intelligently" recognise and respond to individual occupants. Representations of spaces become as vital after construction as they were before; real-time monitoring, feedback and ambient display become integral elements to the ongoing life of spaces and objects. Maintenance and operations become extended inseparable phases of the construction process; a building is never "complete" in OSArc’s world of growth and change. If tomorrow’s buildings and cities will now be more like
computers — than machines — to live in, OSArc provides an open, collaborative framework for writing their operating software.

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